

# CANADIAN MACHINERY

## AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.  
Published by the MacLean Publishing Company, Limited, Toronto, Canada

Vol. XXII., No. 14

Publication Office: Toronto, October 2, 1919.

Subscription Price  
\$3.00 per year.

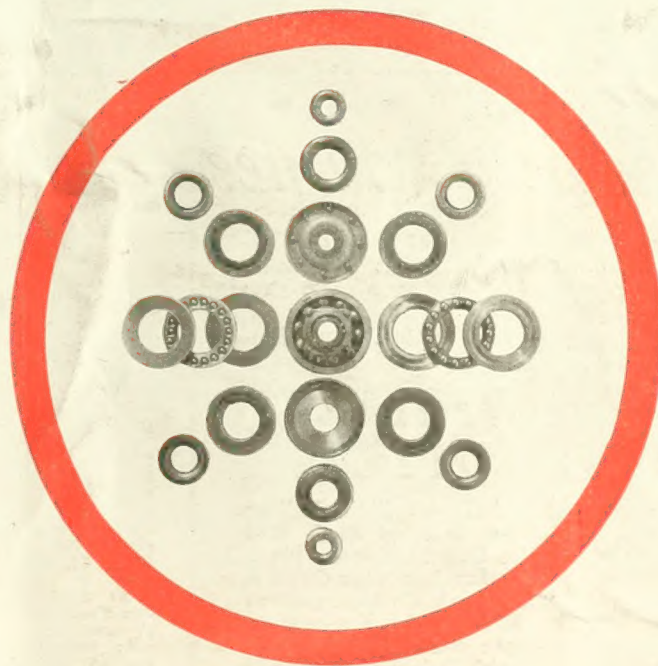
BALL BEARINGS

GRAY

MANUFACTURERS

OF

ROLLER BEARINGS

BALL BEARINGS  
FOR  
ALL PURPOSESAND  
AUTOMOBILE  
PARTS

The largest variety stock of Ball Bearings in Canada.  
Everything in the Ball Bearing line.  
Steel Balls of all sizes and grades shipped from stock.  
Replacement Roller Bearings for Ford and Chevrolet.  
Our Engineering Department is at your service.

*Write for our Catalogue*

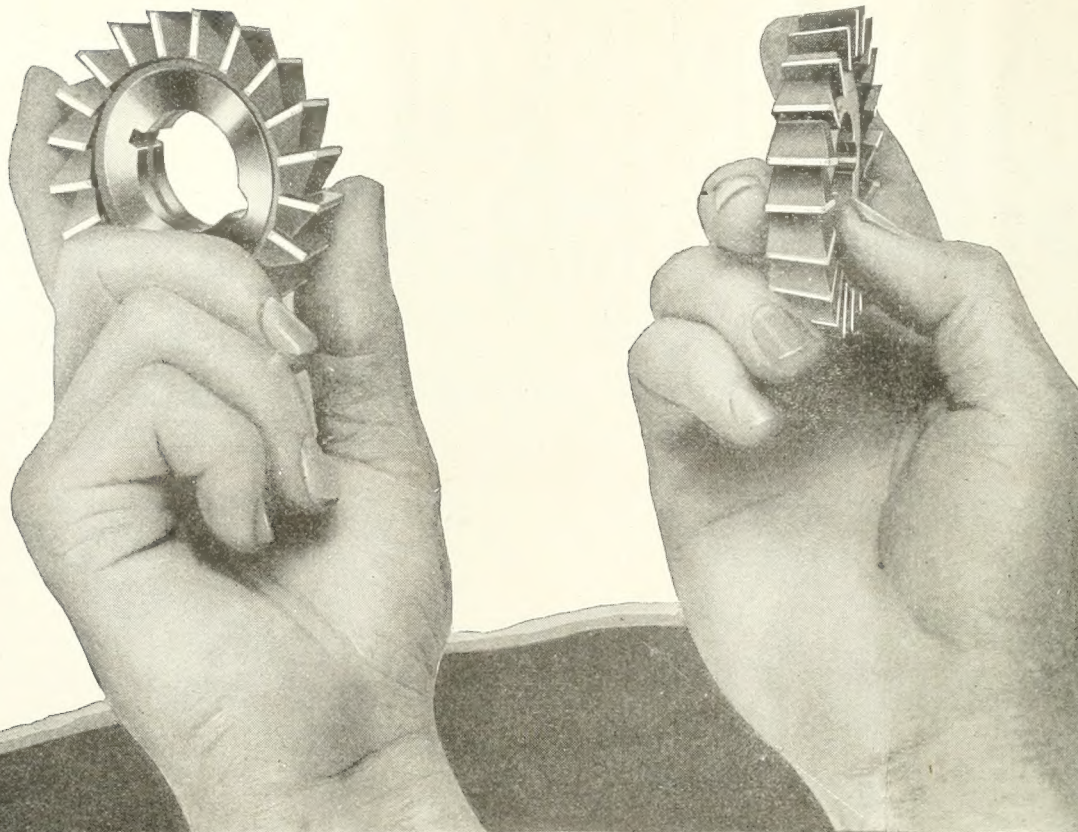
**THE GRAY BALL BEARING COMPANY, LTD.**

686-692 ST. CLARENS AVENUE  
TORONTO

GRAY

GRAY





## *If it's speed you need—*

One trial will prove the advantage of Pratt & Whitney Milling Cutters. No matter what the nature of the work they will give you the highest production the machine is capable of.

They're designed for free, fast cutting. And tempered and seasoned to last longer.

### **PRATT & WHITNEY MILLING CUTTERS**

Ask us for prices and details on Plain Milling Cutters, Side Milling Cutters, Inserted Blade End and Side Cutters, Screw Slot Cutters, Coarse Tooth Side or Plain Milling Cutters, Involute Gear Cutters, Concave, Convex, and Double Angle Cutters, Cutters for Spiral Mills, Roll Thread Die Hobs, Key-seating and Slotting Cutters, Straight and Spiral Cut End Mills (B. & S. and M. T. Shank), Spiral and Straight Shell End Mills, etc.

And we make formed cutters for special work also. All are backed by the guarantee for goodness that the P. & W. trademark indicates.

### *Where you can buy them—*

Boston: 93-95 Oliver St.  
Philadelphia: 405 N.  
21st St. Pittsburgh:  
Frick Bldg. Cleveland:  
O.: The Niles Tool Works  
Co., 338 W. Fourth St.  
Detroit: Kerr Bldg. Chi-  
cago: 571 Washington  
Blvd. St. Louis: 516 N.  
Third St. Birmingham,  
Ala.: 2015 First Ave.  
San Francisco: 16 to 18  
Fremont St. For Can-  
ada: Pratt & Whitney  
Co. of Canada, Ltd.,  
Dundas, Montreal, To-  
ronto, Winnipeg and  
Vancouver.

### **PRATT & WHITNEY COMPANY OF CANADA, LIMITED**

Works : DUNDAS, Ontario

MONTREAL  
723 Drummond Bldg.

TORONTO  
1002 C.P.R. Bldg.

WINNIPEG  
1205 McArthur Bldg.

HALIFAX  
Davidson Bldg.

VANCOUVER  
B.C. Equipment Co.



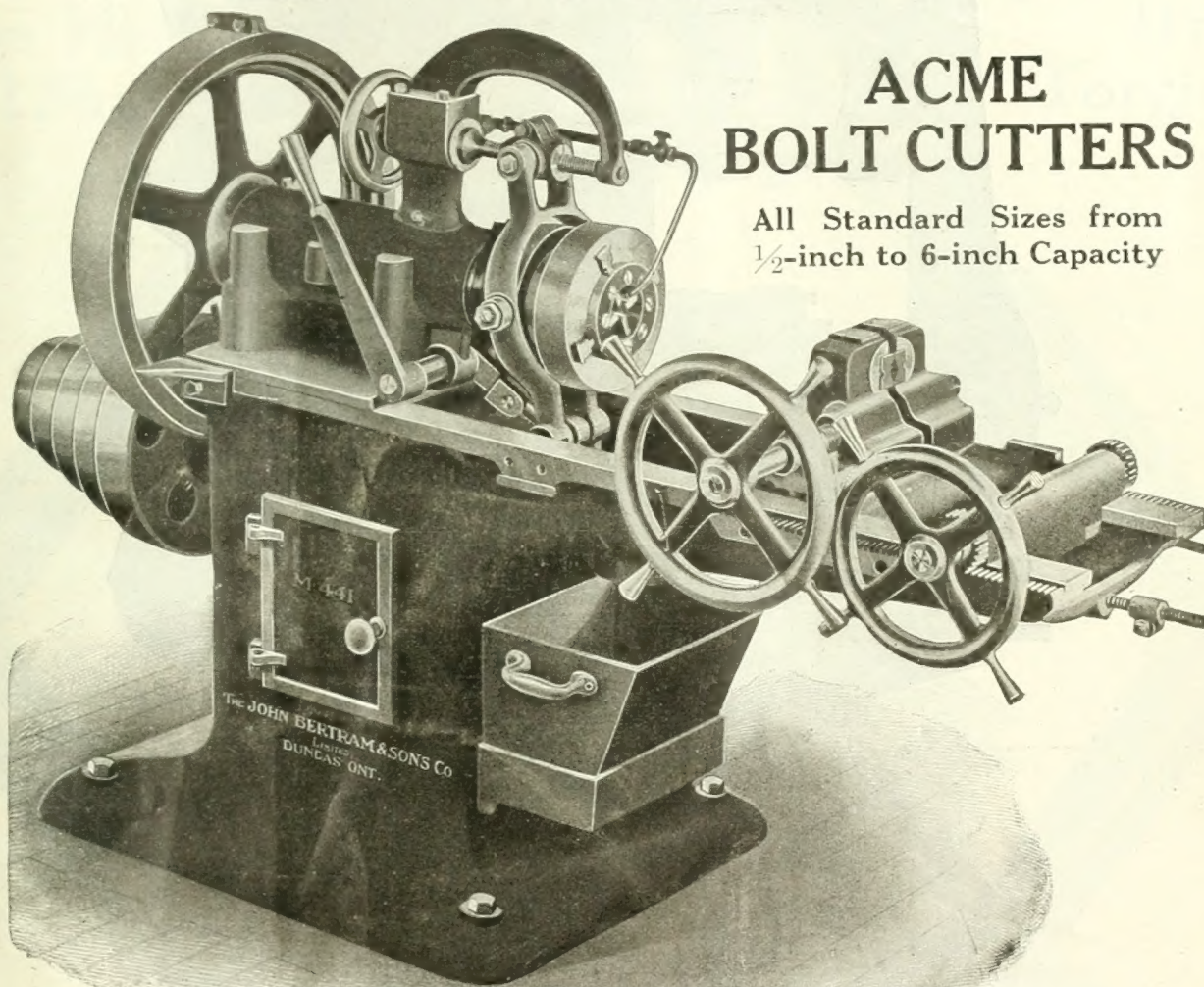


# BERTRAM

## MACHINE TOOLS

### ACME BOLT CUTTERS

All Standard Sizes from  
1/2-inch to 6-inch Capacity



Supplied with Leadscrew Attachment for Stay Bolts or other work  
Requiring Special Accuracy or Pitch.

WRITE US FOR FULL DETAILS OF ANY MACHINE  
OR MACHINES IN WHICH YOU ARE INTERESTED

## The John Bertram & Sons Co., Limited

DUNDAS, ONTARIO, CANADA

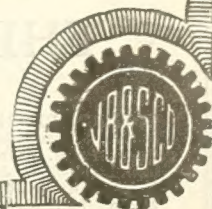
MONTREAL  
723 Drummond Bldg.

TORONTO  
1002 C.P.R. Bldg.

VANCOUVER  
609 Bank of Ottawa Bldg.

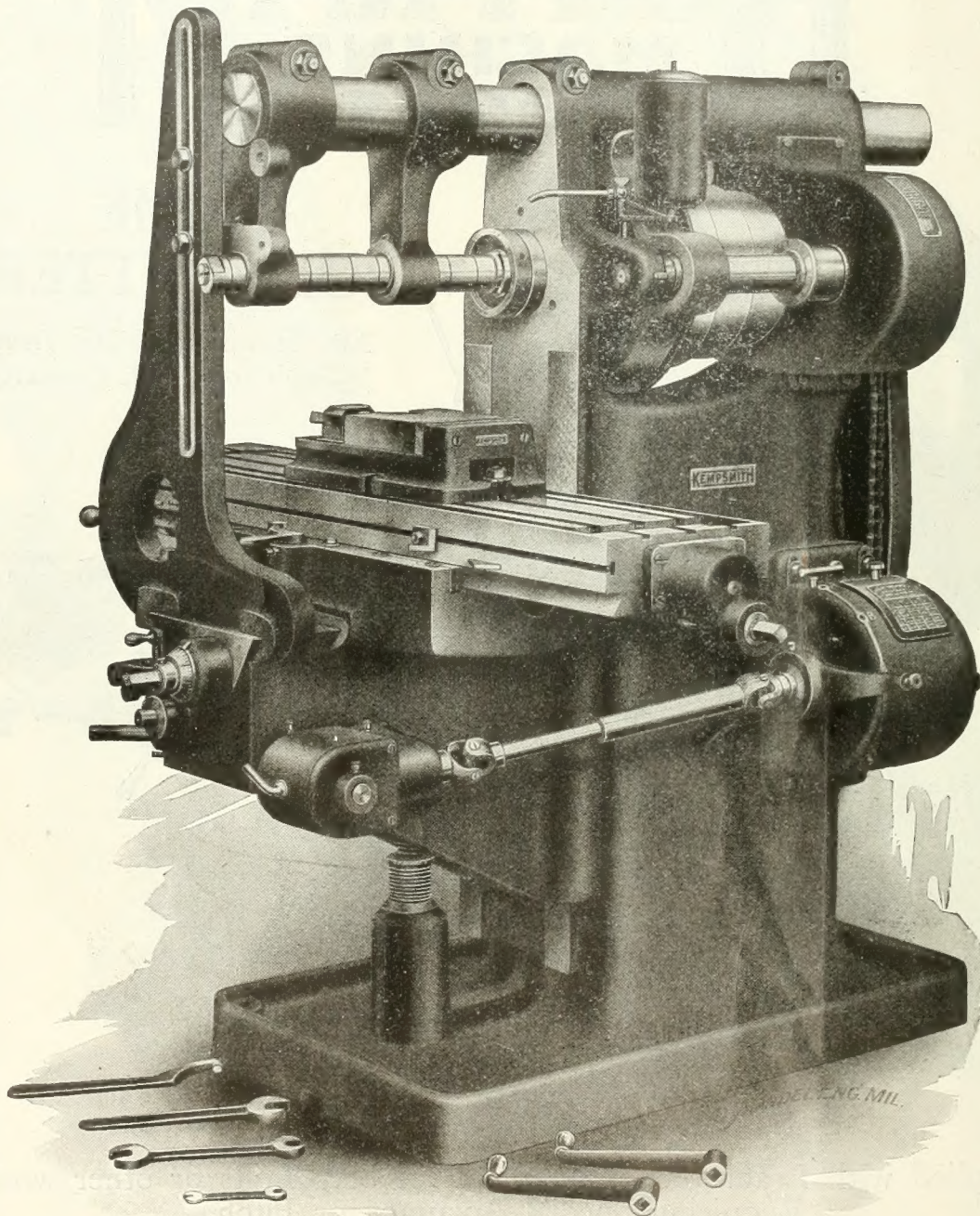
WINNIPEG  
1205 McArthur Bldg.

HALIFAX, Davidson Bldg.





# KEMPSMITH



## KEMPSMITH No. 3 Plain Milling Machine

Double Back Geared.

A heavy, powerful tool with double back gears and wide driving belt running on a three-step cone of large diameter. Our catalogue "B" describes and illustrates many notable features of the Kemp Smith Miller. Write for a copy to-day.

## THE KEMPSMITH MANUFACTURING CO.

MILWAUKEE, WIS., U.S.A.

FOREIGN REPRESENTATIVES:—The Geo. F. Foss Machinery & Supply Co., Limited, 305 St. James St., Montreal, Canada. Barandiaran & Co., 3 Alameda, San Sebastian, Spain. Bevan & Edwards, Pty., Ltd., 117-29 King St., Melbourne, Australia. Edgar Bloxham, 12 Rue du Delta, Paris, France. D. Drury & Co., 1-2 Central House, Main St., Johannesburg, South Africa. Roku-Roku-Shoten, 3 Shinsakanacho, Kyobashiko, Tokyo, Japan. Nielsen & Winthers, Blegdamsveg, 60, Copenhagen, Denmark. Parke & Lacy Co., Ltd., 60 Clarence St., Sydney, N.S.W., Australia. Selson Engr. So., 19 Via Botero, Turin, Italy, and 85 Queen Victoria St., London, E.C., England. Spliethoff, Beeuwkes & Co., Leuvehaven, W.Z., 159, Rotterdam, Holland.

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*



By Product Coke

Hamilton Pig Iron

Open Hearth  
Steel Billets

Steel and  
Iron Bars

Open Hearth  
Steel Sheets

Drop  
Forgings

**Quality**

**THE  
STEEL COMPANY  
OF  
CANADA  
LIMITED  
HAMILTON MONTREAL**

Railway  
Fastenings

Wrought  
Pipe

Pole Line  
Hardware

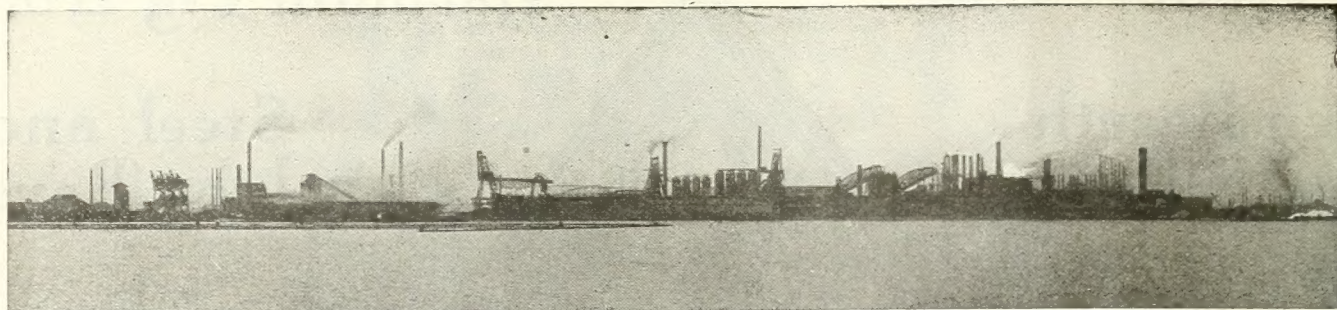
Screws & Nails

Bolts Nuts & Washers

Wire & Wire Products

**Service**





General View of the Plant of the Algoma Steel Corporation from the Waterfront.

# ANNOUNCEMENT



**T**HE ALGOMA STEEL CORPORATION, LIMITED, take pleasure in announcing to their customers and the Canadian trade that in accordance with the widespread desire throughout the Dominion that there should be obtained in Canada with Canadian labor, a much larger proportion of the requirements of this country in STEEL SECTIONS for STRUCTURAL PURPOSES, CAR CONSTRUCTION, SHIPBUILDERS' REQUIREMENTS, etc., they are just completing extensive alterations and additions to their rolling mills, and on or about 1ST NOVEMBER, will be ready to produce and ship American Standard Sections of BEAMS and CHANNELS up to and including 15", all standard sections of ANGLES from 6" x 6" down to 1 1/4" x 1 1/4", ZEE BARS for car builders and general purposes, small and large ROUNDS and SQUARES, and FLAT BARS up to 14" wide. The quality of the product is already well known to the trade, and is exclusively steel made by the Open Hearth process, and can be furnished in all grades from the softest rivet stock to high carbon special spring material. Motto: "Quality and Service."

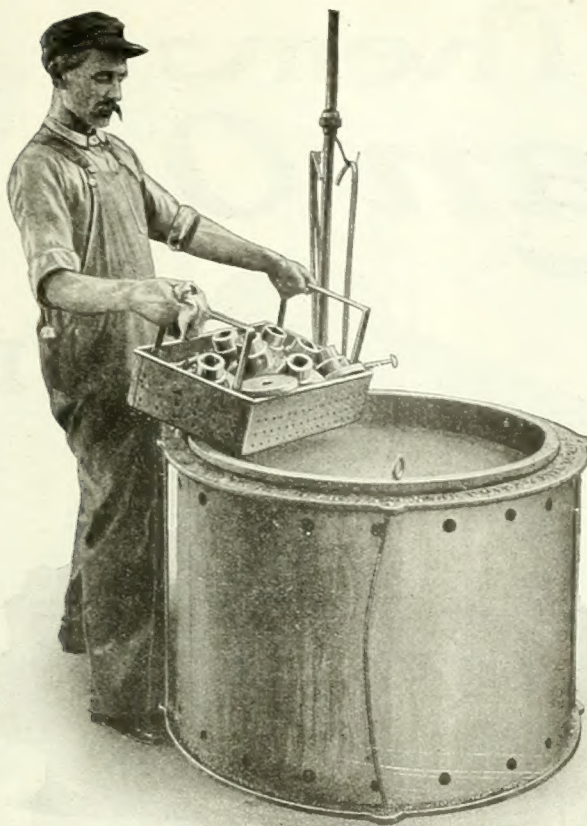
## The following are the sections which will be rolled:--

ANGLES—Equal Leg—	3 1/8 x 4 1/16 x 3 1/8 x 5/16"
6 x 6"—5 x 5"—4 x 4"	3 3/16 x 4 1/8 x 3 3/16 x 3/8"
3 1/2 x 3 1/2"—3 x 3"	2 11/16 x 3 x 2 11/16 x 1/4"
2 1/2 x 2 1/2"—2 1/4 x 2 1/4"	2 3/4 x 3 1/16 x 2 3/4 x 5/16"
2 x 2"—1 3/4 x 1 3/4"	
1 1/2 x 1 1/2"—1 1/4 x 1 1/4"	
ANGLES—Unequal Leg—	ROUNDS—
6 x 4"—6 x 3 1/2"—5 x 4"	All sizes from 1/2" up to and including 4".
5 x 3 1/2"—5 x 3"—4 1/2 x 3"	SQUARES—
4 x 3 1/2"—4 x 3"—3 1/2 x 3"	All sizes from 1/2" up to and including 3".
3 1/2 x 2 1/2"—3 x 2 1/2"—3 x 2"	FLATS—
2 1/2 x 2"	All sizes from 1 x 1/4" up to and including 14" wide.
BEAMS—	MINE RAILS—
15", 12", 10", 8", 6", 5", 4", 3".	All sections from 12 lbs. up to and including 45 lbs. per yard.
CHANNELS—	PIG IRON—
15", 13", 12", 10", 8", 6", 5", 4", 3".	Machine cast FOUNDRY MALLEABLE and BASIC.
ZEEES—	SULPHATE OF AMMONIA.
3 1/4 x 5 x 3 1/4 x 5/16	NITRE CAKE.
3 5/16 x 5 1/16 x 3 5/16 x 3/8"	
3 3/8 x 5 1/8 x 3 3/8 x 7/16"	
3 1/16 x 4 x 3 1/16 x 1/4"	

For the better convenience of customers who may find it necessary to secure rush shipments of particular items, they contemplate keeping a large stock of all the various standard sections constantly on hand, and to this end extensive warehouse facilities are being prepared. Your enquiries and business will be appreciated.

**ALGOMA STEEL CORPORATION**  
SAULT STE. MARIE, ONTARIO



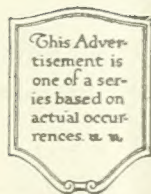


## *Saves \$69 Weekly by Using Oakite*

ONE of the largest motor car plants formerly cleaned steel parts with gasoline at a cost of \$95 a week.

This plant now cleans these parts with Oakite at a cost of \$26 a week.

Oakite saves (\$95 - \$26) a week. Dangers common to the use of gasoline are eliminated. Working conditions are improved. Production is increased. Time is economized.



You can do it too.

*Correspondence invited*

**OAKITE** MANUFACTURED BY  
**OAKLEY CHEMICAL CO.**  
44 THAMES STREET · NEW YORK



# Let Them *Lean On It!*



**"LITTLE  
DAVID"  
AIR  
TOOLS**

**Are made to stand up under hard knocks**  
on every class of service

The workman—skilled or unskilled, the storekeeper, the purchasing agent and the manager, like them because of their **simple construction, low maintenance cost, reliability, speed and power.**

Bulletins illustrating and describing each member of the "Little David" family are yours for the asking



**Canadian Ingersoll-Rand Company**  
**Limited**



Sydney

Sherbrooke

Montreal

Toronto

Cobalt

Winnipeg

Nelson

Vancouver

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*



# WILT

WILT

**HIGH SPEED  
AND CARBON  
TWIST DRILLS  
REAMERS & MILLING CUTTERS**

Illustration shows a Wilt Twist Drill in active service at the new shops of the Canadian National Railway, Leaside, Ontario.

Wilt Quality improves production and cuts drilling costs to a minimum.

This is no theory, no untested statement, but an established fact backed by many of the largest manufacturers throughout Canada. For steady, reliable output of work that is satisfactory from the standpoint both of quantity and quality there is no better choice than WILT products.

*"Where there's a WILT—There's the Way"*

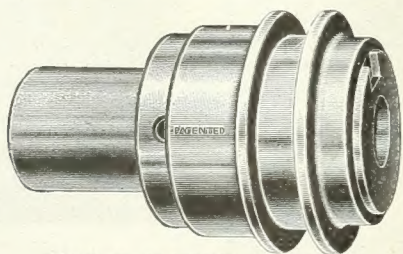
**WILT TWIST DRILL COMPANY**  
OF CANADA, LTD. WALKERVILLE, ONT.

London Office: Wilt Twist Drill Agency, Moorgate Hall,  
Finsbury Pavement, London, E.C. 2, England.

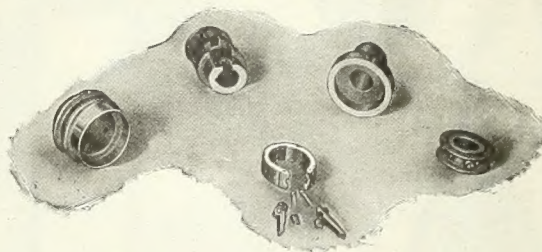
Manufacturers of a paramount line of Twist Drills, Reamers and Milling Cutters



# THE JOHNSON FRICTION CLUTCH



SINGLE CLUTCH—EXTERIOR



## THE SIMPLEST WAY—AND THE BEST

In a clutch or any other mechanical device, unnecessary complication means trouble. Make a single part serve where two have been used before, and you have reduced by one-half the places that can break, wear or get out of adjustment. Put the cost of *extra* material into *better* material, and you have doubled the length of service.

In the Johnson clutch, this idea has been followed out to its practical limits. The result is a model of simplicity in clutch construction—a few sturdy parts, each correctly built and accurately tested for the duty it must perform. This lack of complication means continuous service and low maintenance cost. Johnson Friction Clutches stay on the job.

WE CAN BUILD TO SUIT YOUR NEEDS

WRITE FOR OUR YELLOW DATA SHEETS

CANADIAN AGENTS:

WILLIAMS & WILSON, LIMITED, 84 Inspector Street, Montreal.

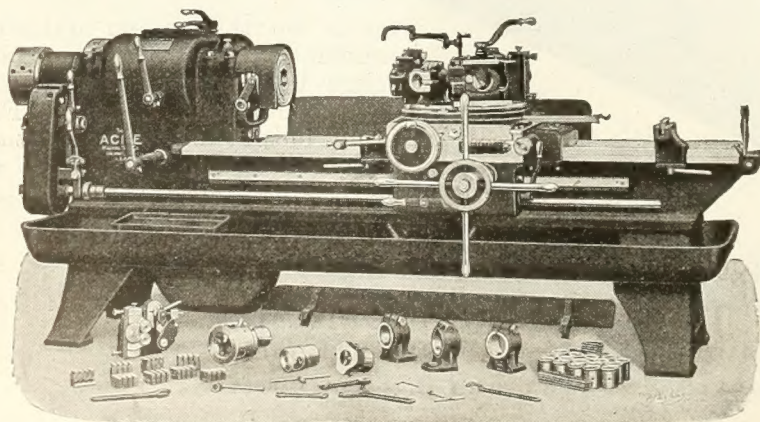
CANADIAN FAIRBANKS-MORSE CO., LIMITED, Montreal, Toronto and Winnipeg.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

## Doubly Efficient—Does Both Bar and Chuck Work

This Cincinnati Acme Flat Turret Lathe is a double-production, geared head machine of the sliding gear type. It operates on minimum power because the only gears running are those doing the actual work.

This machine saves remarkable time and labor machining either bar work or chuck work up to 16 in. diameter.



3½ in. x 36 in. Flat Turret Lathe, Equipped for Bar Work.

Head is cast solid with the bed. You know what that means: accuracy, rigidity, constant and perfect alignment of spindle with vees, upon which the turret carriage travels.

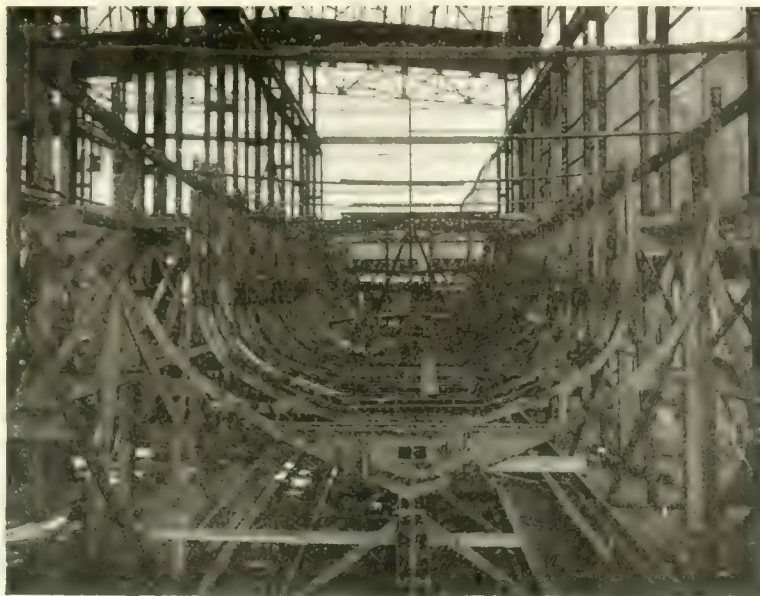
We also make a full line of Screw Machines and Turret Lathes.

Write for Valuable Bulletin

**The Acme  
Machine Tool Co.**  
Cincinnati, Ohio

Canadian Agents: Rudel-Belnap Machinery Co., of Montreal and Toronto





# SHIP CASTINGS IN STEEL

STERN and RUDDER FRAMES,  
SHAFT BRACKETS, ANCHORS,  
ETC.

## CANADIAN STEEL FOUNDRIES LIMITED

Transportation Building, Montreal

Coal  
Coke  
Iron Ore

# Pig Iron

Victoria

FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.  
Port Colborne, Ontario, Canada

## M.A. HANNA & Co.

Sales Agents:  
CLEVELAND

Canadian Office:  
904 C.P.R. Bldg., Toronto

# FIRTH'S Speedicut <sup>HIGH SPEED</sup> Steel

Insures Maximum Production

## FIRTH'S CARBON TOOL STEELS

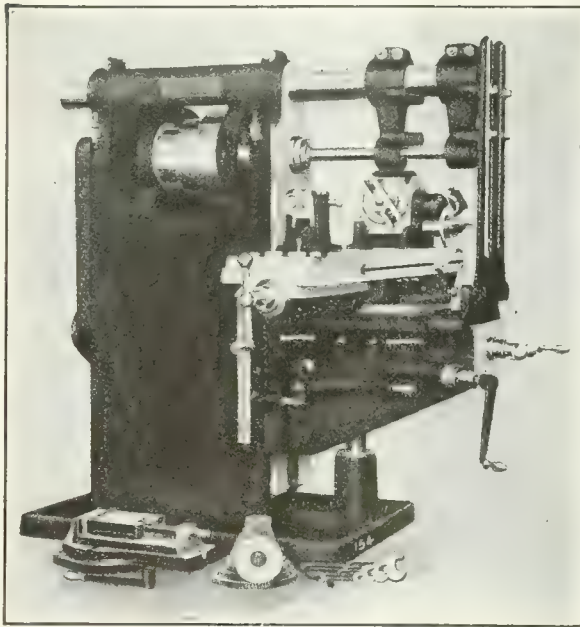
Standard Brands Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES | 445 St. Paul St. West, MONTREAL  
79 West Adelaide St., TORONTO

J. A. SHERWOOD  
Canadian Manager





No. 2 Full Universal

# FORD-SMITH MILLERS

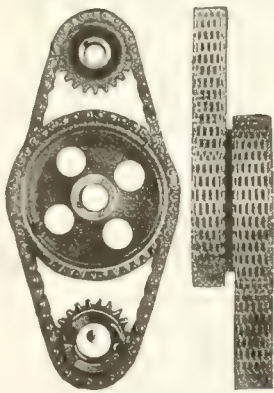
The Miller of high-grade construction—fast, accurate and durable.

Adapted for Heavy Manufacturing or the most exacting tool room service. A suitable Range and Capacity for every class of milling.

## The Ford-Smith Machine Co., Ltd.

Manufacturers of Milling Machines, Disc Grinders, Polishers and Special Machinery

Hamilton, Canada



### War Record Not Made Public

The "Whitney"  
Special Quality  
"Type M" Chains

made a great showing  
during the war years  
1916-7 and 1918.

Our tests and demonstrations were made on prominent 8-cylinder motors in service on a large number of cars in the State of Connecticut.

During this long period not a single "Whitney" Chain or Sprocket had to be replaced and the condition of every Drive has been pronounced remarkable.

One Drive recently examined had given over 35,000 miles' service and both Chains and Sprockets were in such perfect condition that they appeared good for more than double that record (Sprockets having no adjustment).

The links of this SPECIAL CHAIN have finished faces and reamed holes, and the smooth faces do not damage the Sprocket teeth.

Our war contracts were such that we did not announce this SPECIAL CHAIN until after the conflict was over.

THE WHITNEY MFG. CO.,  
Hartford, Connecticut

# Dunbar

## Springs for Every Use

We have been making springs of all kinds for 70 years. Let us advise you when in difficulty.



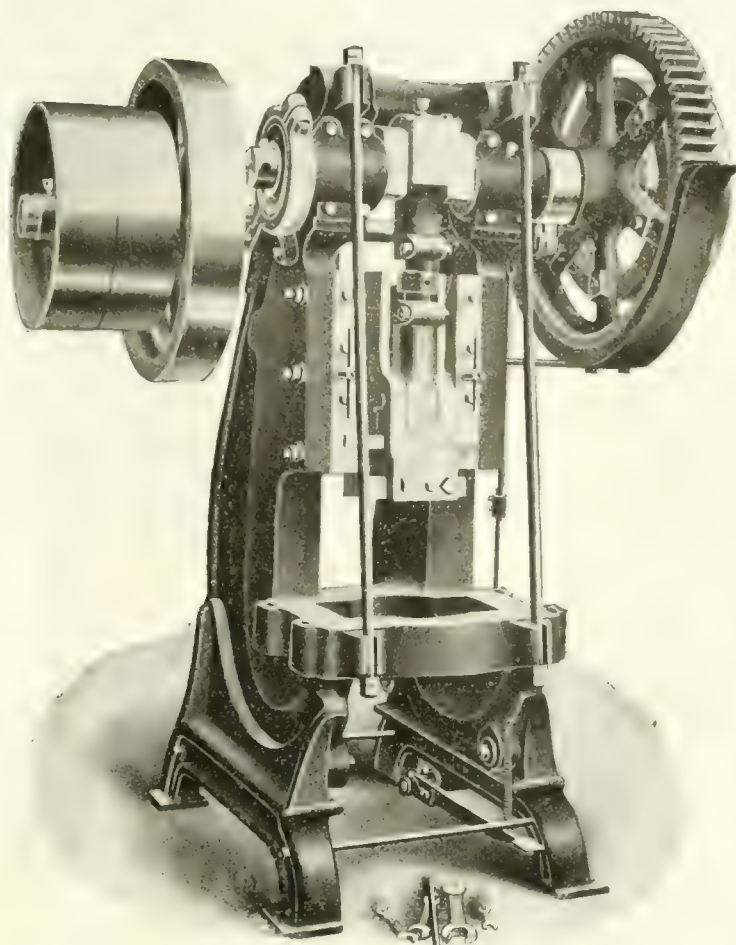
Tell us the purpose for which the spring is intended, and our experts will gladly co-operate to see that you get the design best suited to the purpose.

Dunbar Springs are thoroughly tested for accuracy and quality. Send us specifications, for estimates.

THE DUNBAR BROS. CO.  
BRISTOL, CONN.



# For Your Pressing Needs



No. 215. Inclinable Geared Press.

Quality that is **"Built In"** stands out on all B.B. Power Presses.

The long slides insure accurate work and long life to your dies. The steel pitman screw gives added strength at a vital point.

The Crankshafts are made from high carbon steel forgings and are **"Heat Treated"** so as to give the maximum shock-resisting qualities and prevent crystallization. This is a feature no other press manufacturer can claim.

Let us quote on your next presses. The machines are the best that can be produced and our prices are low in comparison with the value you will get.

## The Brown Boggs Co., Limited

Hamilton, Canada

Manufacturers of Presses, Shears, Rolls, etc., also Tinsmiths' Tools and Sheet Metal Working Machinery of every description.



# BRITAIN'S BEST

## KE

### BRANDS OF ALLOY & TOOL STEELS

In Billets, Bars, Sheets, Hot and  
Cold Rolled Strips, Cold Drawn  
Cast Steel, Wire and Drill Rods  
HIGH GRADE STEEL FOR ALL PURPOSES



Our Principal Trade Marks

# KAYSER ELLISON & CO LTD

ESTABLISHED 1825  
Complete Stock

SHEFFIELD, ENG.  
Montreal Warehouse

## RALPH B. NORTON

Agent

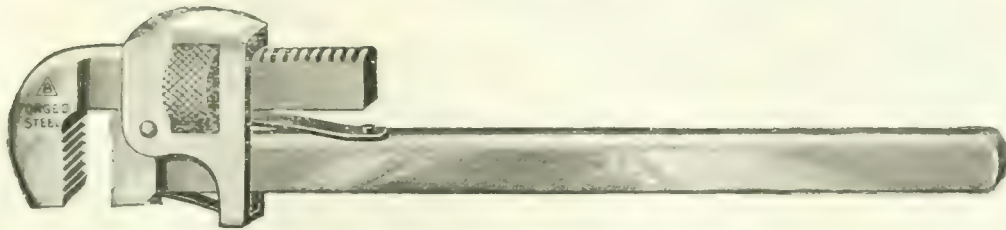
126 Craig St. West

Montreal, Que.



# CANADA FOUNDRIES & FORGINGS LIMITED

## ENDURANCE TOOLS NEVER WEAR OUT



PIPE THE WRENCH—WRENCH THE PIPE

Canadian Billings & Spencer Plant  
Welland, Ont.

## Crucible AND Open Hearth Steel Tool Steel

**"ARGO" BRAND HIGH-SPEED STEEL**

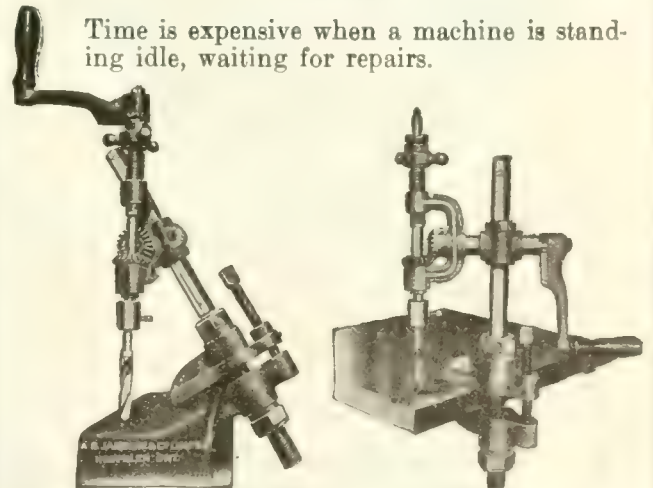
**The John Illingworth Steel Co.**  
1856

Frankford, Phila.  
New York Office 217 Broadway

RALPH B. NORTON, AGENT  
Montreal, Canada

## Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.



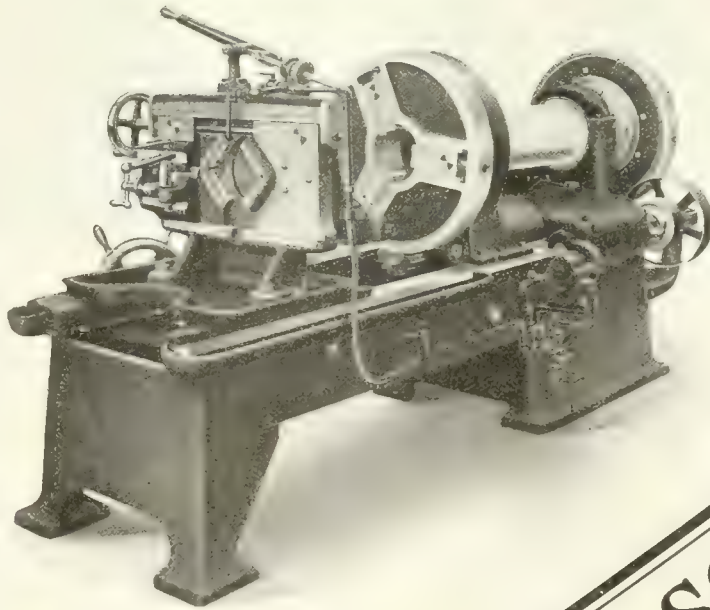
On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, \$26.50 net

Sold by all Machinery and Supply Houses

**A. B. JARDINE & CO., Limited**  
HESPELER, ONTARIO





*No. 6 Belt Drive  
Capacity 1 1/4 to 6"  
Built to  
Last*

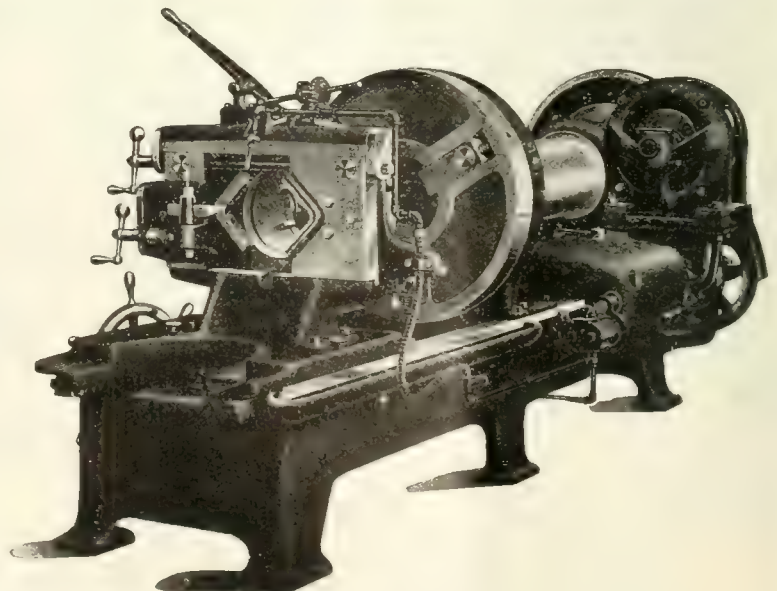
**OUR SPECIALTY  
PIPE MACHINERY**

**JOHN H. HALL & SONS, LIMITED**  
BRANTFORD, ONTARIO  
MANUFACTURERS OF  
**Pipe Threading Machinery**

**All  
Sizes  
Pipe Machines  
Nipple Machines  
Roller Pipe Cutters**

*No. 8 Motor Drive  
Capacity 2 1/2 to 8"*

*Write for new  
Descriptive Bulletins  
Just Issued*



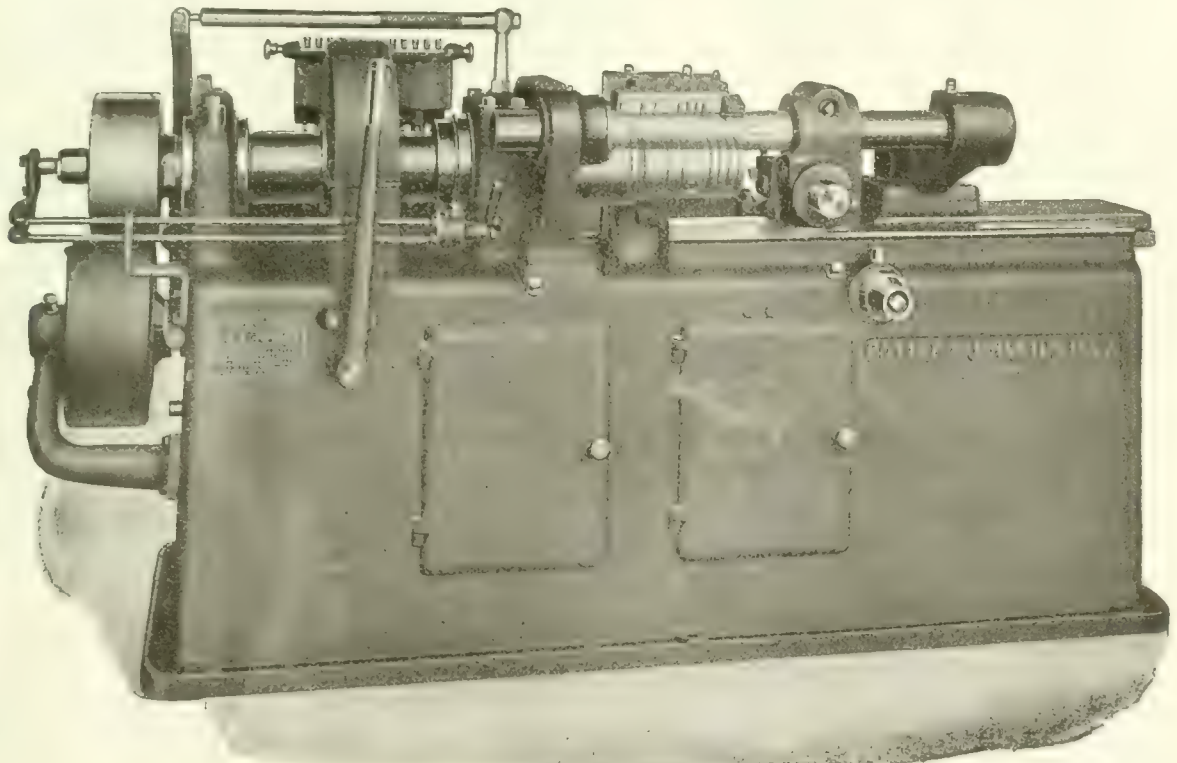


# PISTONS AND PISTON RINGS MACHINED AUTOMATICALLY

**Most Efficient.**

**Most Economical.**

One attendant operates two or three machines. Boring and turning tools piloted insures extreme accuracy and maximum output.



2P Combination Piston and Piston Ring Machine, showing method of automatically machining pistons, with air-operated drawback arbor, piloted turning tool holder, cross slide grooving and facing block. Over fifty machines installed by the largest Automobile builder in the world is a fitting testimonial as to the efficiency of the Automatic Piston and Piston Ring Machine. Let us have your drawings or samples for production estimate.

**May we send you Bulletin 24?**

*Canadian Offices:* POTTER & JOHNSTON MACHINE CO.

## **ROELOFSON MACHINE & TOOL CO., LIMITED**

*Head Office:* 1501 Royal Bank Building, Toronto, Canada

*Works and Warehouse:* Galt, Ont., Canada.



# Counter-

## No. 4

### Of a series of Technical Talks on Ball Bearings

THE top diagram shows the rigid type hanger and standard type radial bearings, and also a ball bearing loose pulley. The point of interest in this application is the use of rigid hangers, which is made possible by the self-aligning feature of the SKF Ball Bearings. The shaft is turned down at each end to form a shoulder against which the bearing is locked by a nut. Felt grooves are provided on the inner side of each housing and end caps on the outer sides. The outer race of one bearing is rigid in the housing to take care of the end thrust and the outer race of the other bearing is free to "float."

The application shown in the centre drawing is similar to the one described above, except that the hangers are adjustable. Plain radial bearings are used and the shaft turned down at each end as in the above application.

The lower diagram shows SKF adapter type ball bearings mounted on a countershaft with standard type hangers. The housing is held in the frame by four adjusting screws and has felt washers for retaining the lubricant and excluding dust or dirt, etc. Set collars are used for taking care of the side play.

For loose pulleys the ball bearings, two in number, usually 1200 series, are mounted on a sleeve which is clamped to the shaft by means of a set collar. The bearings are mounted against shoulders on the sleeve the necessary distance apart, the inner race being held firmly in position by the two end caps. The housing is dust proof and provided with a filling plug for grease.

SKF Ball Bearings are also used in clutches, jack shafts and idlers, the method of mounting for idlers being very similar to that employed for loose pulleys and the same series of bearing usually used. In clutches, adapter type ball bearings are usually employed, although radial bearings can also be used. In the latter case the bearings are mounted on a sleeve and locked in position by nuts.

The advantages of the above applications are apparent, as countershafts usually run at high speed and the elimination of friction, saving in lubrication and attention are important factors. The application to the loose pulley is worthy of special notice, as the pulley revolves round a stationary shaft. In plain bearings this causes the lubricant to leave the point of lubrication through centrifugal force, with consequent heating and seizure. In the case of the ball bearing pulley, the oil or grease is flung against the outer chamber which is the point of lubrication, thus preventing the bearing running dry and heating.

Canadian **SKF** Company, Limited

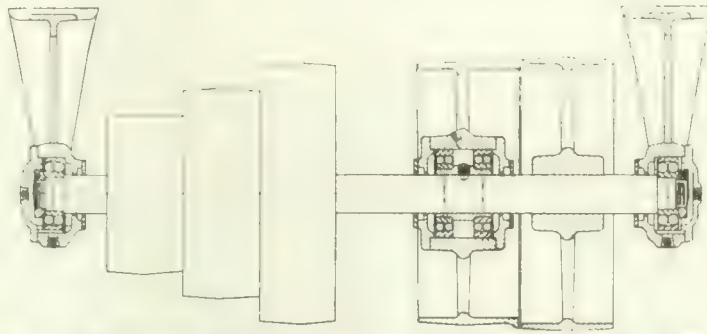
*Eastern Sales Office;*  
412 St. James St. West  
Montreal, P.Q.

*Head Office;*  
47 King St. West  
Toronto, Ont.

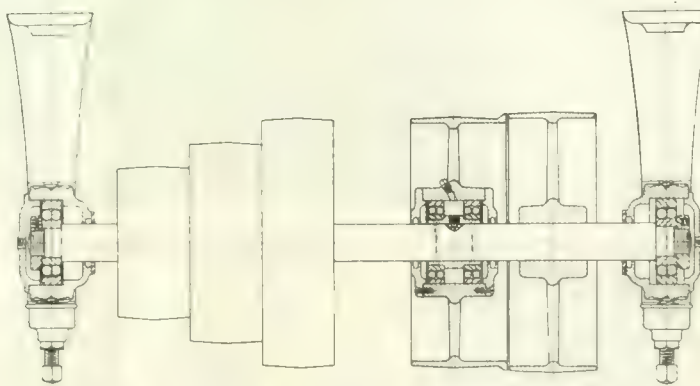


# Shafts

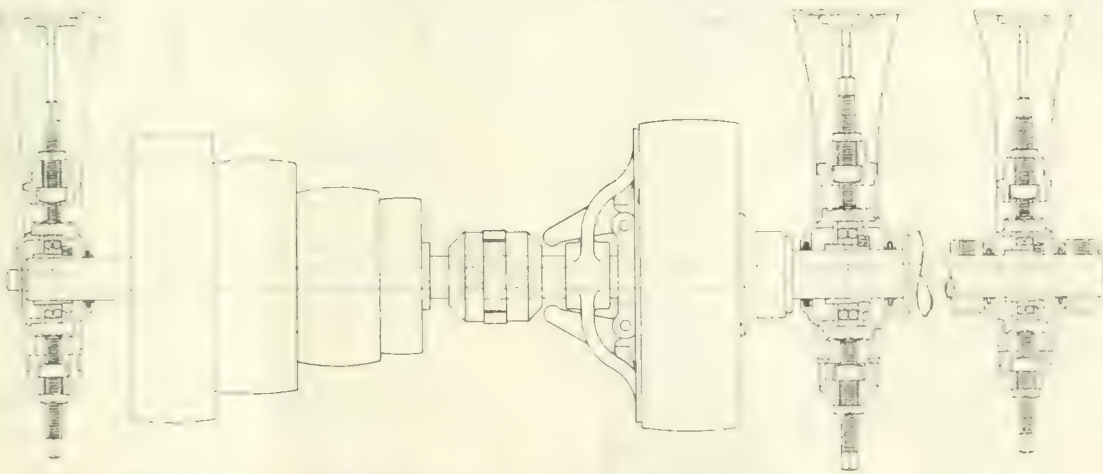
Send us your name and address so that we can put you on our mailing list for a complete set of these articles.



Rigid type hanger and standard type SKF radial bearings. The aligning feature of the SKF bearing allows the use of rigid hangers. No other bearing will give satisfaction when used with rigid type hangers.



Adjustable type hanger and standard type SKF radial bearings.



Ball bearing mounting showing SKF adapter type bearings applied to countershaft, standard type adjustable hanger casings.

*If interested tear out this page and place with letters to be advertisers listed under proper heading.*



# STEEL *for*

## Every Commercial Purpose

We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

**Nova Scotia  
Steel and Coal  
Co., Limited**

Head Offices:  
New Glasgow, N.S.

Western Sales Offices:  
Room 14 Windsor Hotel  
MONTREAL



Steel Ingots  
by the  
**HARMET**  
Liquid Process

**Swedish Steel & Importing  
Co., Limited**

Montreal  
New York

Toronto  
Denver

Direct representatives of foremost  
Swedish mills;  
makers of

## Tool Steels

ALLOY STEELS, BILLETS,  
BARS, DISCS, SHEETS,  
HIGH SPEED STEELS,  
DRILL RODS, DRAWN  
BARS, SEAMLESS TUB-  
ING, COLD ROLLED STRIP  
STEEL, WELDING WIRE,  
WROUGHT AND ROLLED  
IRON, PIG IRON, STEEL  
AND IRON ENDS, HOL-  
LOW AND SOLID MINING  
DRILL STEEL.



PROMPT SHIPMENTS  
from large stock

**ES&M**

# ELECTRIC Steel Castings

High Grade STEEL Castings  
Of Every Description

**Prompt Deliveries**

Send us your drawings  
for estimates.

**THE ELECTRIC STEEL AND METALS  
COMPANY, LIMITED**

WELLAND

ONTARIO



# SaBeN ExTrA HIGH SPEED STEEL

The Highest Achievement  
of British Tool Steel  
Metallurgy

**HADDRY COMPANY**  
LIMITED

MONTREAL

TORONTO

NEW YORK



# “WACO”



TRADE MARK

## HIGH SPEED STEEL



TRADE MARK

“DOUBLE WACO” 18% Tungsten, for Railway and Tram-  
way Tires and Hard Metals

“WACO” 14% Tungsten, for Turning, Planing and Slot-  
ting Tools, Milling Cutters, Taps, Rimers, Twist Drills

### CARBON TOOL STEELS for

Engineers', Railway, Boilermakers', Shipbuilders', Min-  
ers and Blacksmiths' purposes in various qualities  
Diamond Special Extra Best Quality Best Warranted  
Warranted Ordinary

Each quality supplied in different tempers to suit tool  
required

### DIE STEELS for

Screwing Dies, Stamping Dies, Top and Bottom Nail  
Dies, Cartridge Dies, Mint Dies, Dies for  
Hot Stamping, Drawing Dies

### COMBINED IRON AND STEEL for

Beds, Dies, Machine Irons, Blades, etc.  
MINERS' DRILL STEEL

In three qualities

Extra Special Special Ordinary

### HOLLOW DRILL STEEL

Round or Octagon

Stainless Cutlery Steel Single or Double Shear Steel

### SPECIAL MAGNET STEEL

Hammer and Wedge Steel, Scythe and Sickle Steel

“WACO” High Speed Twist Drills Carbon Twist Drills

## MARSHALL, SON & BUNNEY

39 Richmond Street East TORONTO, ONT.

SOLE CANADIAN AGENTS FOR

**WM. ATKINS & CO., LIMITED**  
SHEFFIELD - - ENGLAND

PRICES ON APPLICATION FOR  
IMPORT OR STOCK ORDERS

*If interested tear out this page and place with letters to be answered.*





# ELECTRICITE

**High  
Speed  
Steel**

**S**EVERAL factors combine to make this high-speed steel a triumph of the steel-maker's art; Electric Furnaces — entirely infallible, automatically regulated, delivering the same result time after time.

**Uranium** — This rare element, cousin to Radium, effects a profound change in the texture and quality of the steel.

Added to these, the constant care and skill of years of steel-making experience make the result of each melt a foregone conclusion.

**Latrobe Electric Steel Co.**  
LATROBE, PENN.

# URANIUM

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*



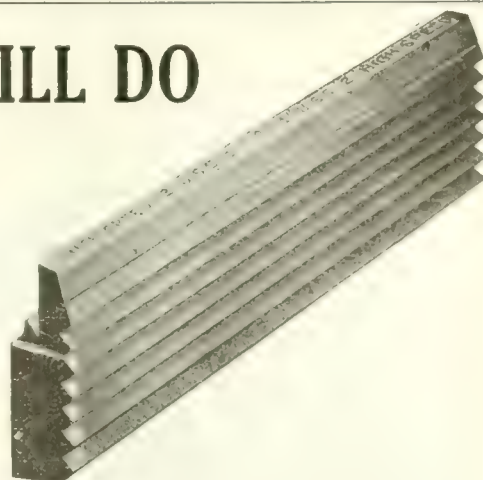
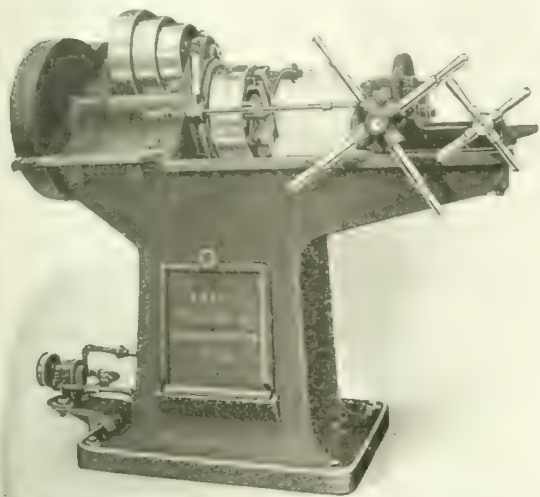
# NOTHING BUT A LANDIS WILL DO

When you consider the purchase of a threading machine and the superintendent wants one that is speedy, reliable and economical—it can only be a Landis.

These facts may be helpful in coming to a decision.

Long life of chaser which exceeds that of any other die by twenty times at least.

Variable rake angle which permits of a grinding suitable to the material being threaded.



No annealing, hobbing or retempering, a slight grinding at the cutting edge renews the die.

Right and left hand threading with the same set of chasers.

Don't consider the initial cost of a threading machine all important; it's the cost of die upkeep that makes it expensive or economical. That is why the Landis may cost you a little more—the upkeep of the chaser is almost negligible compared to other dies.

Study the Other Features in Catalogue No. 24.

**LANDIS MACHINE COMPANY**  
Waynesboro, Pa.

Cut Your Cutting-  
off Costs in  
**HALF**

**T**O say that the Hurlbut, Rogers Cutting-Off and Centering Machine will double your production and cut your costs in half may seem like a broad claim. But this is just what this machine will do compared with any ordinary machine of its kind.

Hurlbut, Rogers speed and efficiency is easily explained. Instead of only one, it is equipped with two cutting-off tools—one cutting up and the other down. In this way they hold the work against each other and finish a job in just half the time and do twice the work.

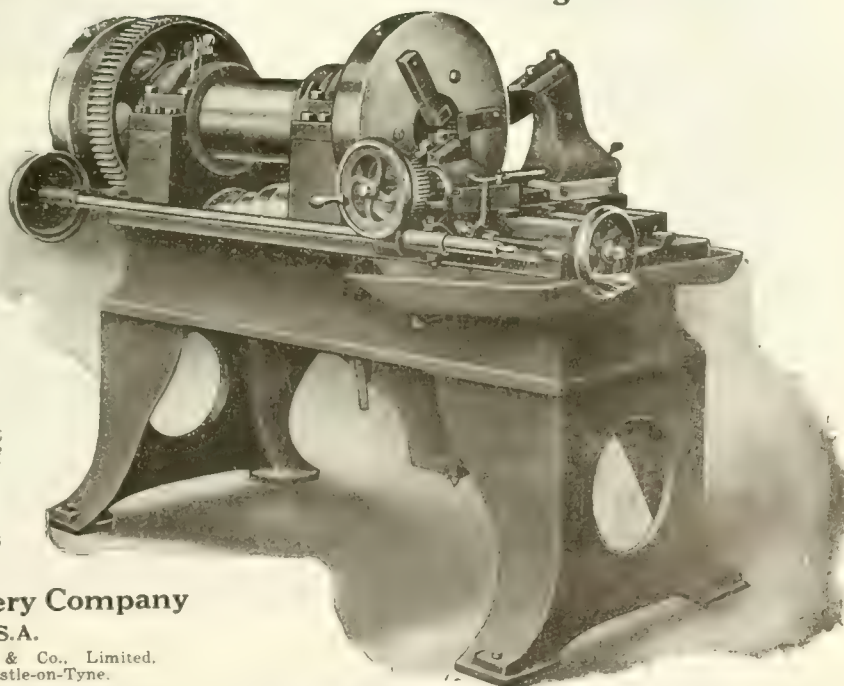
You can't afford to be without this machine. It saves real money. Let us tell you more about it. Write!

**The Hurlbut, Rogers Machinery Company**  
South Sudbury, Mass., U.S.A.

Foreign Agents—England: Chas. Churchill & Co., Limited.  
London, Manchester, Glasgow and Newcastle-on-Tyne.

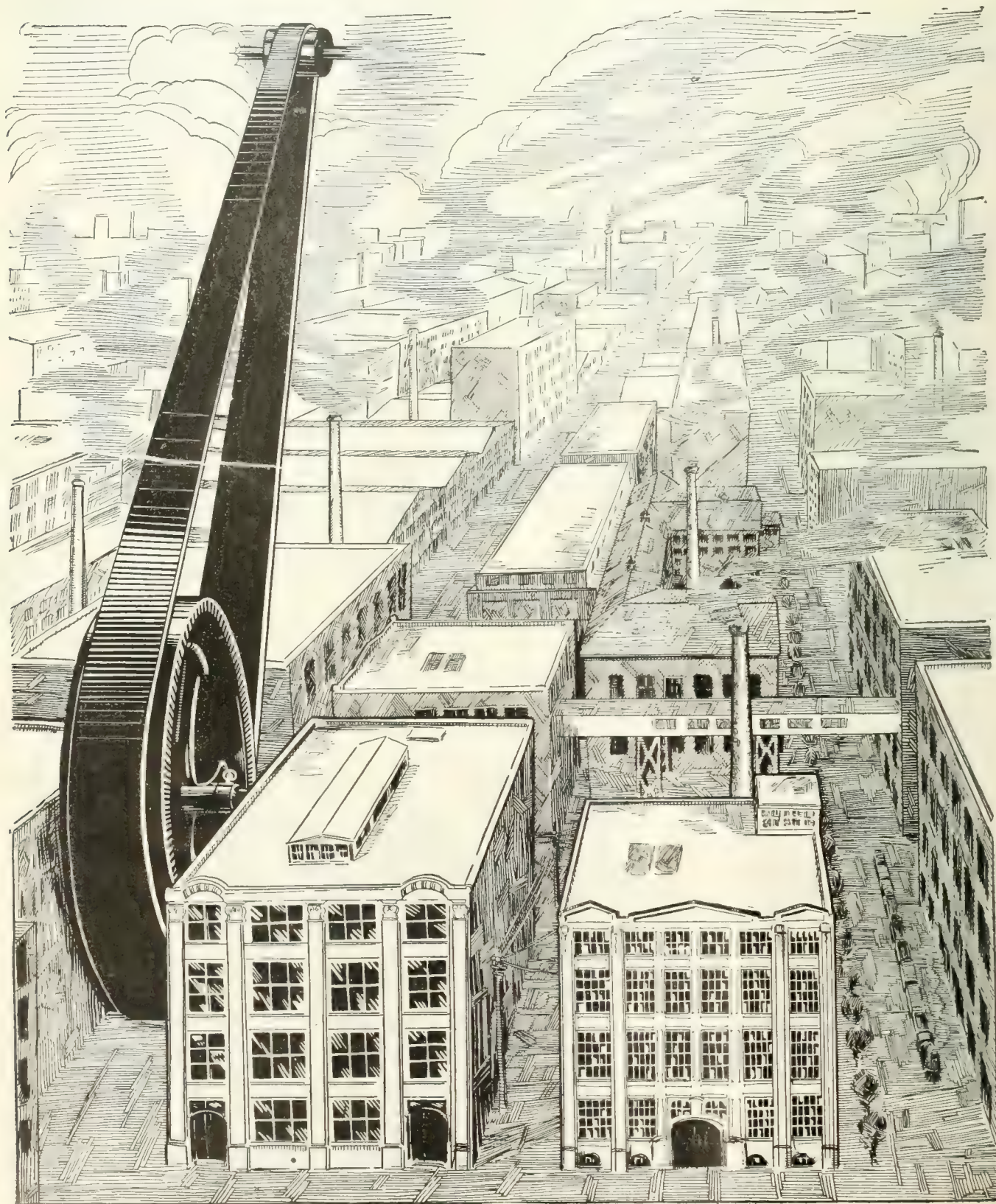
# HURLBUT'S

Patent Cutting-off and  
Centering Machines



*If interested tear out this page and place with letters to be answered.*







# OVER 1000 INDUSTRIALS USE

**GOODYEAR**  
MADE IN CANADA

## EXTRA POWER BELTING

**O**N RECORD in our offices alone are the names of over 1000 Canadian industrials who are satisfied users of Goodyear Extra Power Belting.

A vast hive of industry, giving employment to thousands upon thousands of men. Engaged in every form of industrial activity known in the Dominion. Turning out millions of dollars' worth of Canadian products every year.

What an overwhelming endorsement of Goodyear Extra Power Belting this is. Belts bought to fill every transmission requirement. Working

under varied conditions. All required to deliver satisfaction. Think of the great power-saving because Extra Power Belting is flexible. It grips the pulleys and combats slipping. Greater production has almost invariably followed the use of Goodyear Extra Power.

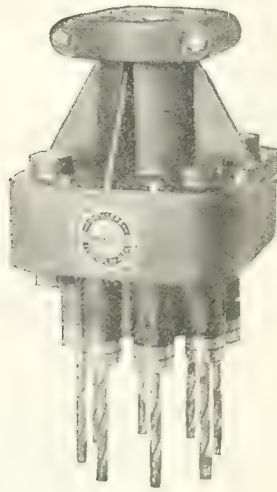
Over a thousand trained engineers and superintendents cannot be misled. You cannot blind over a thousand purchasing agents. There must be—there is—something vital in the Goodyear Extra Power Belting story. Let us send a man trained by Goodyear in belting problems to talk it over with you. He will tell you about Extra Power as it applies to your plant. Should Extra Power not be suited to your needs, we would rather have your friendship than your order. Phone or write the nearest branch.

**The Goodyear Tire & Rubber Company of Canada, Limited**

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, London,  
Winnipeg, Regina, Calgary, Edmonton, Vancouver



## 2 Minutes or 20?



### This Is The Vital Question

Do you drill ten holes in the time it takes for one? The Hoefer Auxiliary Head equips any driller so as to accomplish this big saving in time. It speeds up production in drilling tremendously. Not only do you save the drilling time, but also the time now lost in shifting the jigs and raising and lowering the spindle for the extra holes.

Hoefer Auxiliary Heads are made in any multiple, arranged in any manner, from 2 up. They are made by expert tool makers and unqualifiedly guaranteed to handle accurately the work for which they are designed.

Investigate now—every day you use a single drill where the multiple may be used you are paying for an auxiliary head through increased costs, but not securing its benefits.

Write for catalog. Send a blueprint of some of your work for estimate of time and cost.



**THE**  
**HÖEFER**  
Mfg. Co., Freeport, Ill.

621 Washington Blvd., Phone Haymarket 2408, Chicago, Illinois; 1113 Citizens' Bldg., Phone Main 795, Cleveland, Ohio; 708 Empire Building, Phone Court 1911 or 1912, Pittsburgh, Pa.; 602 Kerr Building, Phone Cherry 2884, Detroit, Mich.; 30 Church Street, Phone Cortland 1615, New York City; Badger-Packard Mch. Co., Milwaukee, Wisconsin; National Supply Co., Toledo, Ohio.

### The Canadian Fairbanks-Morse Co., Limited

"Canada's Departmental House For Mechanical Goods"

Halifax St. John Quebec Montreal Ottawa Toronto Hamilton Windsor  
Winnipeg Saskatoon Calgary Vancouver Victoria

**SMELTERS**

**METALS**

**DEALERS**

## COPPER AND BRASS INGOTS

Made in Standard Mixtures or According to Specifications



Our guaranteed analysis Brass Ingot Metal will save you money in your metal purchases, also you have the positive assurance of exactness and accuracy of quality, and in casting the elimination of melting losses and defective castings.

"EVERY METAL THE BRASS FOUNDER NEEDS"

### THE CANADA METAL CO., LIMITED

HAMILTON

MONTREAL

TORONTO

WINNIPEG

VANCOUVER

**THE**



**FOUNDRY**  
GALT - ONT.

## Do Your Castings Cost Too Much?

A rearrangement of your patterns might cut their cost 25%; a different method of molding them might double your production at no increase in molding cost. We can advise you and we have expert metal and wood pattern-makers who are able to make any changes that may commend themselves to you.

### If you need some new Patterns

send us a sample, blueprint or sketch, and ask for our advice. It won't cost you anything. If our advice is good and commends itself to you, it is only fair to assume that our work will be equally satisfactory, and we need the work as badly as you need the patterns.

We are in a position to do turning, boring, drilling or other semi-finishing operations on castings supplied by us.

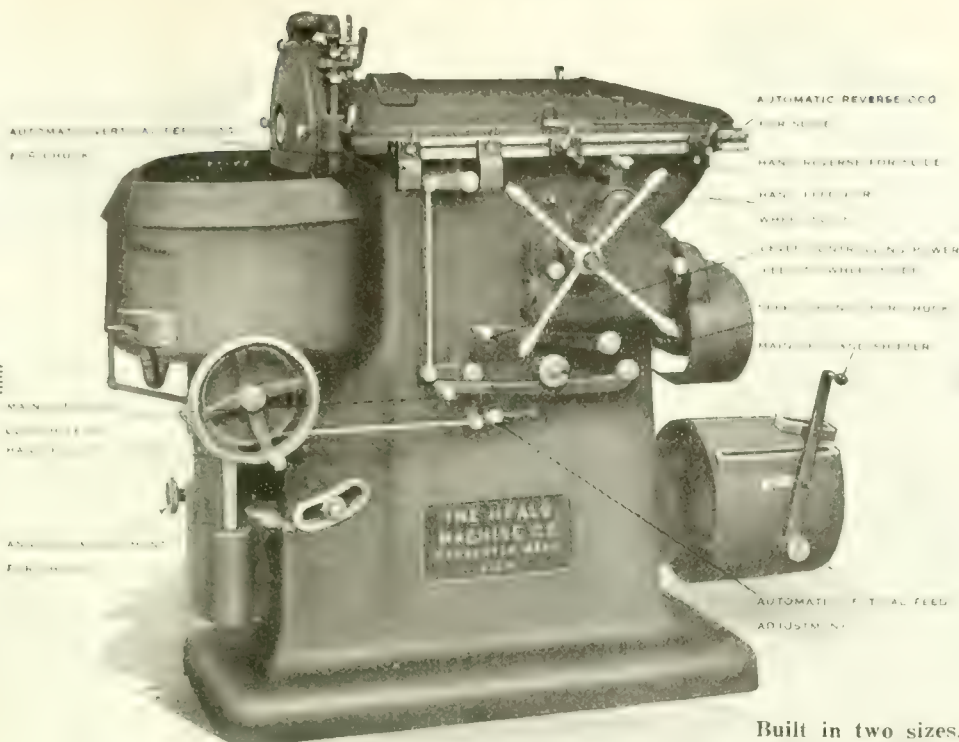
**ASK US**



**GRIND WITH A**



AND BE SURE



GRIND WITH A



## AND BE SURE

Built in two sizes,  
with 8" and 12"  
magnetic chucks

# THE LAST WORD ON ROTARY SURFACE GRINDERS

The new HEALD No. 20 and No. 22 machine is a simple, productive and accurate rotary surface grinder. That the new machines meet the first requirements can be seen from the photograph above. In regard to production and finish, experiments have proven these new machines have no equal in the field to-day.

The WHEEL SIDE is a massive casting having a flat and "V" way insuring continued alignment. Bearing surfaces are large and well protected. Spindle belt operates with a downward pull; an important factor in rigidity.

The chrome nickel WHEEL SPINDLE is mounted in large bearings, all adjustments of which are made at grinding wheel end through an opening in top of slide.

The MAIN DRIVE UNIT receives power from the main line by tight and loose pulleys, transmitting it

directly by belt to main speed box, wheel spindle and pump.

MAIN SPEED BOX, situated on the rear of machine, furnishes power to wheel slide by a 3-step cone, and operates the chuck, which has three speeds, through a bank of gears. Wheel slide and chuck are independent of each other, permitting a large latitude in speeds and feeds.

Chuck spindle is driven by spiral gears, one of which is mounted directly on the spindle. Spindle itself is mounted in a sleeve which has vertical adjustment. Upper portion rests in a taper bearing, lower end being equipped with ball bearings—wear is automatically taken up. All control levers and adjustments are within easy reach of operator.

Complete water apparatus is furnished with each machine; built in two sizes, 8 in. and 12 in., with Heald Magnetic Chucks are regular equipment. Motor drive if desired.

## May We Send You Literature?

THE HEALD MACHINE COMPANY  
WORCESTER, MASS.

BRANCH OFFICES: New York, 839 Singer Bldg., Philadelphia, 1308 Commonwealth Bldg. Chicago, 20 South Jefferson St. Detroit, 401 Marquette Bldg. Cincinnati, 311 Provident Bank Bldg. Cleveland, 721 Engineers Bldg. Western Agents: Eccles & Smith Co., Los Angeles, San Francisco and Portland, Salt Lake Hardware Co., Utah and Idaho.

FOREIGN AGENTS: Alfred Herbert, Ltd., England. Societe Anonyme, Alfred Herbert, France, Switzerland. Societa Anonima Italiana, Alfred Herbert, Italy. F. W. Horne Co., Japan. Wihl Sonesson & Co., Sweden, Denmark and Norway. Henri Benedictus, Brussels, Belgium. American Machinery Syndicate, Spain and Portugal.

*If interested tear out this page and place with letters to be answered.*



# Individuality

VANADIUM ALLOYS  
STEEL CO.  
LATROBE, PA.

HIGH SPEED  
STEEL

RED-CUT SUPERIOR

RED-CUT SUPERIOR

STEEL CO.

A GREAT MAN wrote this: "I'm called away by particular business, but I leave my character behind me." And nobody had to guess whose character it was. Even if the familiar Red Cut label should disappear there would be no doubt as to the character of the steel that remained. More than ever would the quality shine forth in the results when it was worked. Adherence to the highest standard with an unvarying uniformity has placed a well merited reputation all its own on

## "Red Cut Superior"

The Nationally Known--First Quality  
**HIGH SPEED STEEL**

The Best For All Machine Work

**VANADIUM-ALLOYS  
STEEL CO.**

General Offices : Pittsburgh, Pa.

Works : Latrobe, Pa.

#### BRANCH OFFICES

BUFFALO	CHICAGO	NEW YORK
BOSTON	CINCINNATI	PHILADELPHIA
CLEVELAND	DETROIT	PITTSBURGH
TORONTO		MONTREAL



**HIGH SPEED STEEL**  
**INTRA STEEL GIBRALTAR STEEL**  
**Tool Steel for Every Purpose**  
**Swedish Lancashire Iron**

Twist Drills, Taps, Hack Saw Blades, Milling Cutters,  
Files, Etc., Music Wire for Springs, Steel Balls.  
Cold Rolled Tool Steel in Strips and Sheets  
Circular Saws, Machine Knives.

**PILOT STEEL & TOOL COMPANY,**  
LIMITED  
332 St. James Street, Montreal

Sole Agents for  
JONAS & COLVER, LIMITED H. BOKER & CO., Inc.  
Novo and Continental Steel Works, New York, N.Y.  
Sheffield, Eng.



XXX Genuine Arctic Metal will give satisfactory results in the most troublesome bearings. Will last longer and save many times its cost in repairs. Will reduce your overhead expense.

**Tallman Brass & Metal Limited**  
**HAMILTON, ONT.**



# KELLY

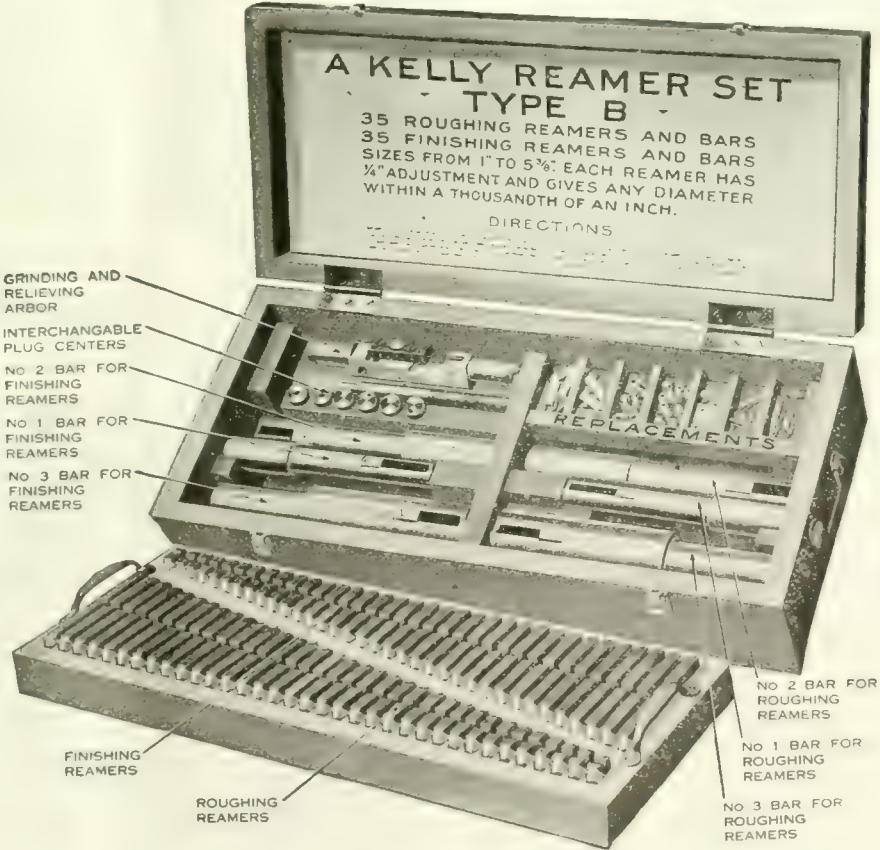
## “Production” Tools that “Produce”

*Here it is, Mr. Manager*

## “A TOOL ROOM IN ITSELF”

Every size in Roughing and Finishing reamers from 1" to 5 3/8" diameter in Fractional or Metric sizes. No matter how odd the size, it's there. No delay, no holdup in production, always Ready for Service. They Adjust. Indispensable to your tool room, Turret Lathe or Screw Machine Department. No machine shop should be without this set.

READY  
FOR  
SERVICE



READY  
FOR  
SERVICE

Just one of the KELLY TOOL FAMILY

Write for our new catalogue J-4 and see THEM ALL

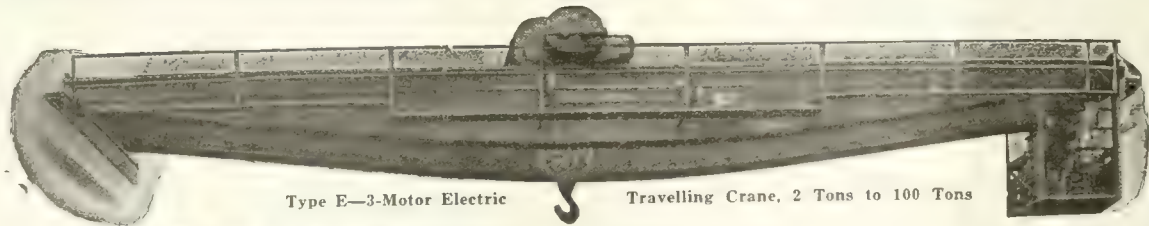
**THE KELLY REAMER COMPANY**  
CLEVELAND, OHIO, U.S.A.



CANADIAN MADE

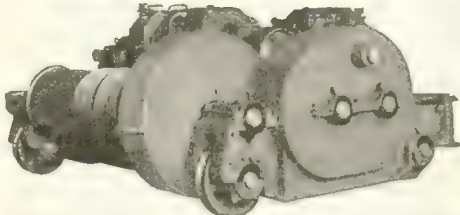
CANADIAN MADE

# Electric and Hand Traveling Cranes



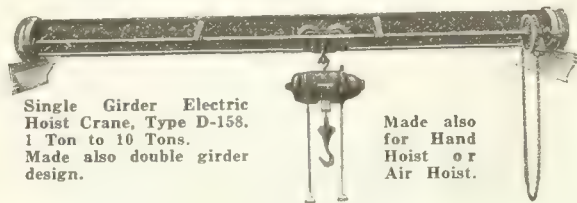
Type E-3-Motor Electric

Travelling Crane, 2 Tons to 100 Tons



Northern Type E Crane Trolley, Rigid, Enclosed Construction. Patented in Canada.

We make a wide range of CRANE and HOIST designs. All sizes and capacities, 1 ton to 100 tons.



Single Girder Electric Hoist Crane, Type D-158. 1 Ton to 10 Tons. Made also double girder design.

Made also for Hand Hoist or Air Hoist.

Get our prices and specifications before you buy.

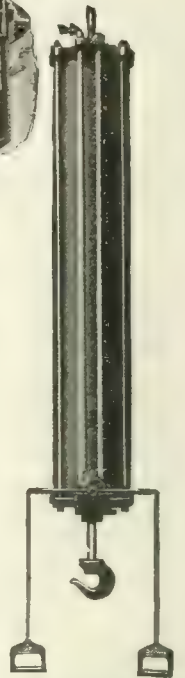
In asking prices, state SERVICE, CAPACITY, SIZE OR SPAN POWER, and, if electric, KIND OF CURRENT.

Catalogs free.



Type D Electric Hoists — ½ to 10 Tons.

Air Hoists, Trolleys and Tracks.



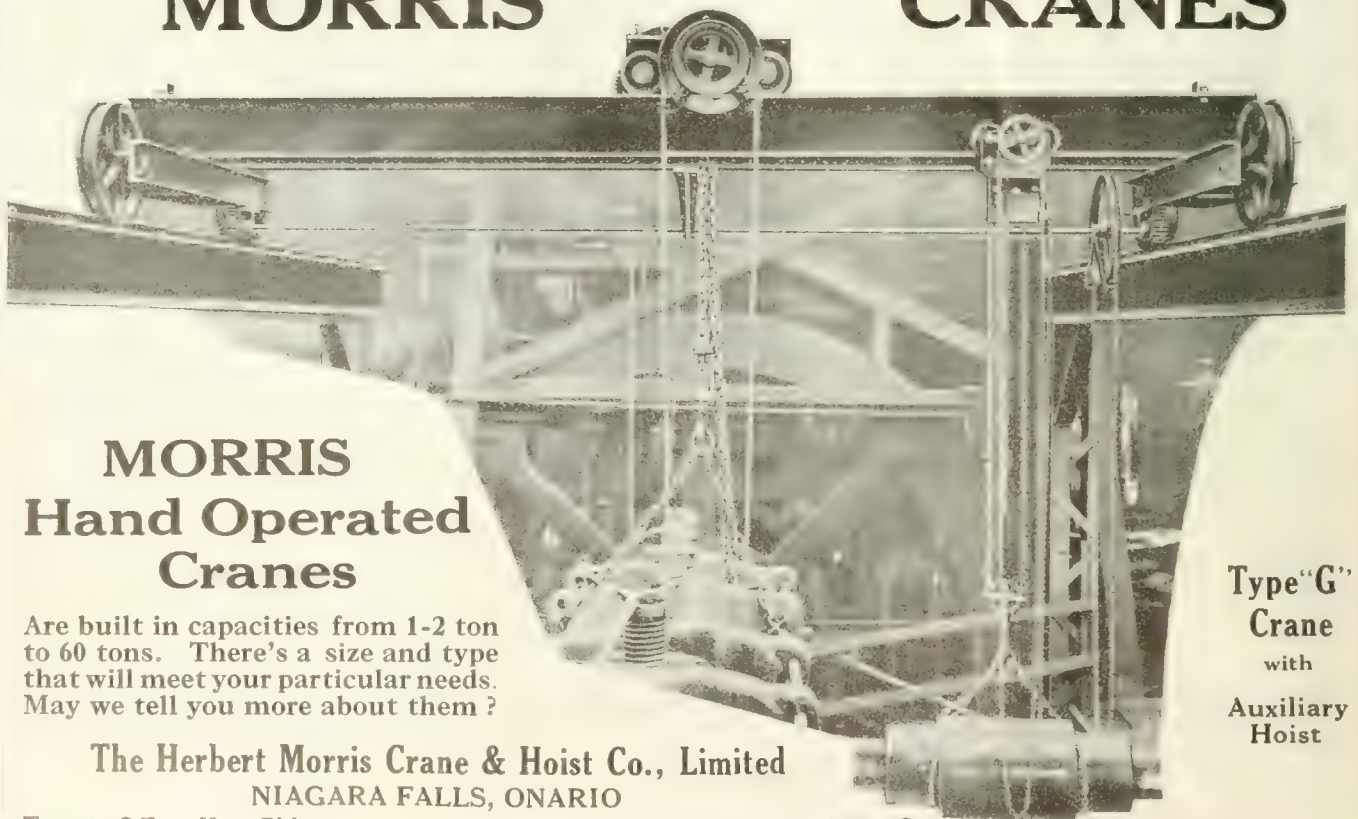
Type No. 20 Air Hoist.

## Northern Crane Works, Limited

Walkerville, Ontario, Canada

# MORRIS

# CRANES



## MORRIS Hand Operated Cranes

Are built in capacities from 1-2 ton to 60 tons. There's a size and type that will meet your particular needs. May we tell you more about them?

The Herbert Morris Crane & Hoist Co., Limited  
NIAGARA FALLS, ONARIO

Toronto Office: Kent Bldg.

Montreal Office: 296 St. James St.

Type "G"  
Crane  
with  
Auxiliary  
Hoist

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.



# CURTIS

## CRANES

Have an enviable reputation for safety and ease of operation. Preferred in many leading industrial plants for their simplicity of design, being quick and easy to erect and therefore very low in cost of installation. Strong, rigid, dependable. Right in every detail. "They move the load with minimum energy." Hyatt Roller Bearings throughout.

Various types, hand and pneumatic, up to 20,000 lbs. capacity. Write for illustrated descriptive literature.

Curtis Pneumatic Machinery Co.  
1585 Kienlen Ave., St. Louis, U. S. A.  
Branch Office:  
532-A Hudson Terminal, New York City



Sectional view of Curtis Crane Wheel showing Hyatt Flexible Roller Bearings.

## Keeps down the cost of milling Small Parts

These small millers are built to handle small milling jobs, quickly, accurately and economically.

The U.S. Miller so greatly increases output of small parts as to actually reduce milling cost 1/3 to 1/2.

Neither in power nor capacity is any other miller of similar size its equal.

May we send catalog and full specifications?



# U.S. MILLER

Manufactured by

United States Machine Tool Company  
Cincinnati, Ohio, U.S.A.

## FORD TRIBLOC

For doing things quicker, more efficiently and with less hand labor, the Ford Tribloc is used in a thousand lines of industry, in this country and abroad.

The Ford Tribloc is a hand chain hoist. Dependability and durability are built into it. In capacities of 1/2 to 10 tons, mounted in waiting for a year.

FORD CHAIN BLOCK & MFG. COMPANY  
Philadelphia, Pa.



If what you need is not advertised, consult our Buyers' Directory and write to the firms listed under proper heading.



# To cut down the cost per cut

## How Many S. P. M.?

“Haste makes waste” is just as true of hack saws as of anything else. Forcing a blade by increasing the strokes per minute means a quickly dulled blade. 50 to 60 strokes per minute is about as fast as it is economical to run when cutting dry. On soft steel, using compound, saws may be run to advantage at about 100 S. P. M., at from 65 to 80 on annealed steel, and on unannealed tool steel at about 60 to 80 strokes per minute.

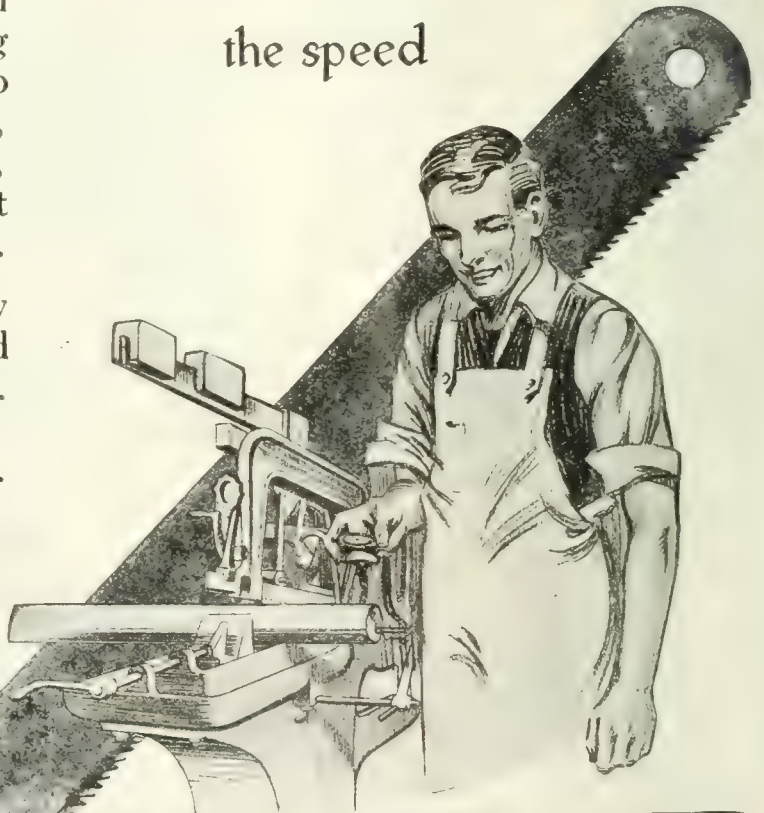
Follow the Starrett Hack Saw Chart, put on the weight and watch the cutting cost decrease.

### THE L. S. STARRETT CO.

The World's Greatest Toolmakers  
Manufacturers of Hack Saws Unexcelled  
ATHOL, MASS.

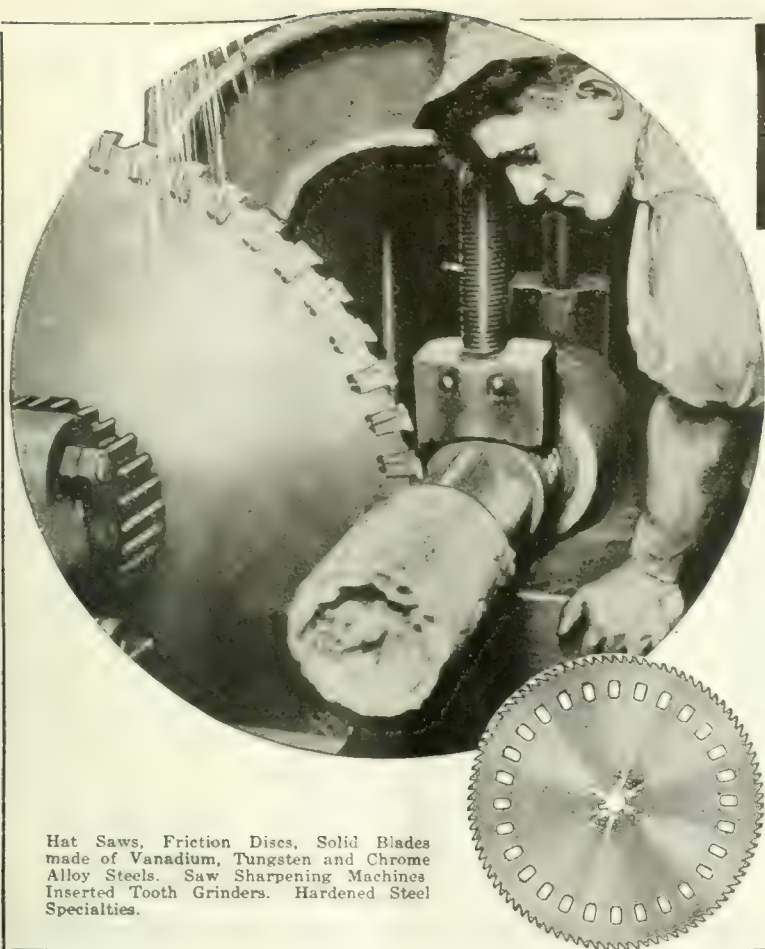


the speed



## Use Starrett Hack Saw Blades





Hat Saws, Friction Discs, Solid Blades made of Vanadium, Tungsten and Chrome Alloy Steels. Saw Sharpening Machines Inserted Tooth Grinders. Hardened Steel Specialties.

# HUNTER

## Duplex Saws

The selection of many of the best and largest companies in the country for cutting ingots, bars, forgings, castings, rails and structural shapes.

Their fast cutting qualities mean a saving of time and power, plus increased production.

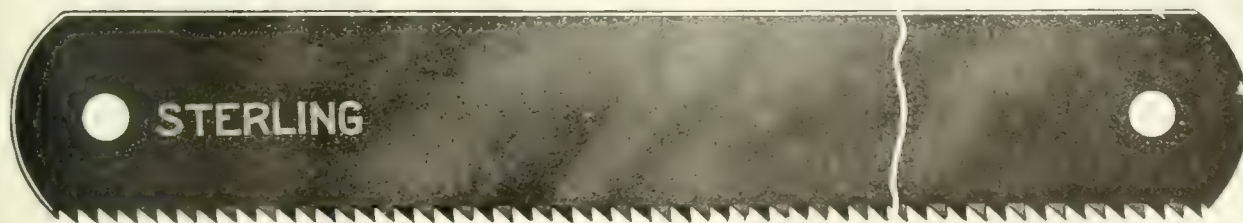
Teeth are accurately formed, ground and set for highest speed and greatest endurance. Made in sizes up to 90 in. in diameter.

*Write for price list and full particulars*

**HUNTER SAW & MACHINE CO.**  
Pittsburgh, Pa.

# "STERLING"

## HACK SAW BLADES



A brand once adopted, difficult to replace.

**REASONS**—High quality of material used, mechanical construction, and special heat treatment.

**RESULTS**—Economy, which means satisfied customers.

*Write for Information and Prices*

**DIAMOND SAW & STAMPING WORKS**  
BUFFALO, N.Y., U.S.A.

*If interested tear out this page and place with letters to be answered.*



*Standard the  
World Over*

# "THE RACINE"

## HIGH SPEED METAL CUTTING MACHINE

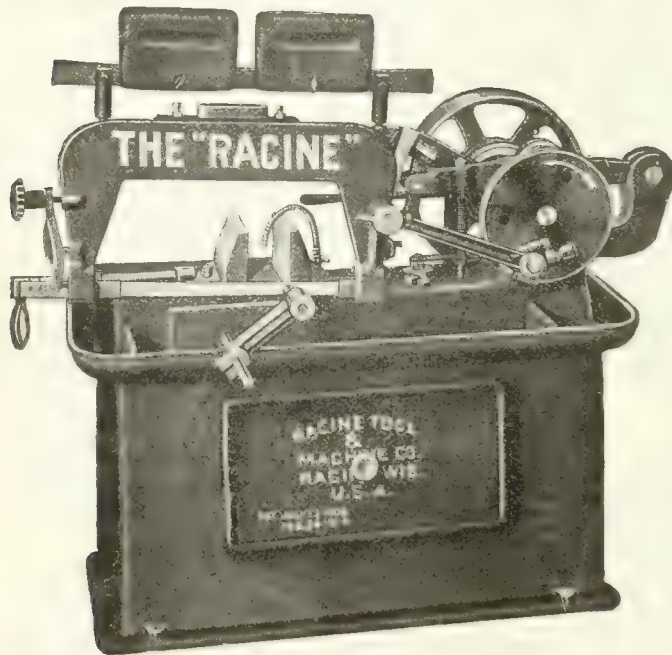
### Reduces Blade Expense

Aside from its ability to turn out more work than any other metal cutting machine, "THE RACINE" will save you considerable money on blades alone—enough to pay for itself in a reasonable time. The automatic lifting device is responsible for that. It automatically raises the blade on the return stroke, relieving it of all dragging or strain. This also means quicker cutting, less power used and greater production.

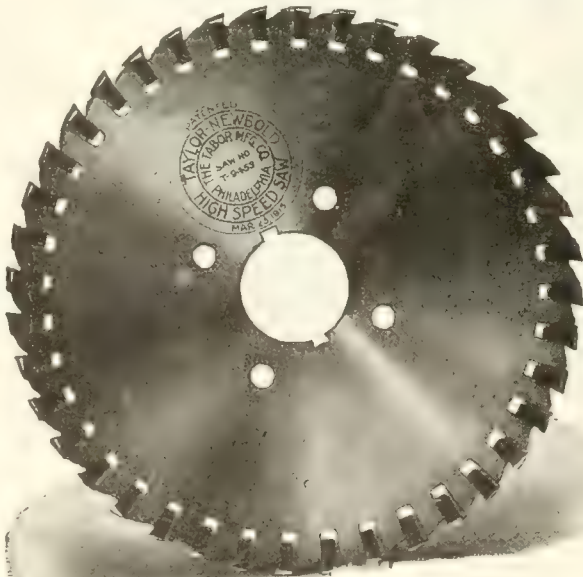
There are many ways "THE RACINE" will prove a big saving. Let us tell them to you.

*Use "Racine" H.S. Tungsten Power Blades*

**Racine Tool & Machine Co.**  
Melbourne Avenue, - RACINE, WIS. U.S.A.



## THE IMPROVED TAYLOR-NEWBOLD



### INSERTED TOOTH COLD SAW

WRITE FOR BULLETIN T-S

**Tabor Mfg. Co., Philadelphia, Pa., U.S.A.**

Would you like to have us prove that

*Peerless* **HIGH  
SPEED**

Machines do 50 to 100% more work



The Peerless has established a new standard of production in so many plants that we are ready to ship one at our expense and risk, if you agree to give it a thorough test. A trial like this often results in our selling from 1 to 10 machines.

### The Balance Lift of the Peerless

automatically raises the blade for the return stroke. This greatly prolongs the life of the blades, economizes power, and increases production. There are more good features which we shall be glad to acquaint you with.

The Peerless assures you the peak of production at very lowest cost. Write for full details.

**PEERLESS MACHINE CO.**

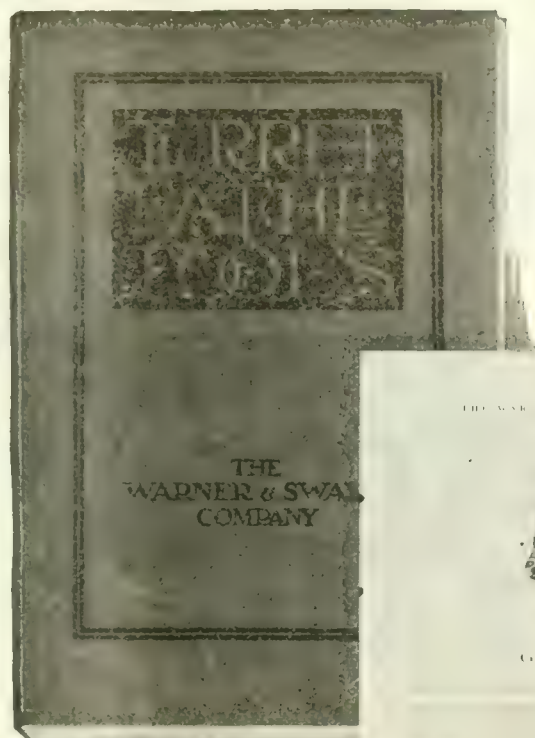
1607 RACINE STREET

RACINE, WISCONSIN

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*



# Get Your Copy



A most complete line of turret lathe tools. Here are tools for every purpose, and we have them in stock. Get your copy of our catalog. Second edition is now ready.



W & S tools save money by increasing production and saving the time of designing and making special tools.

## THE WARNER & SWASEY COMPANY CLEVELAND, OHIO, U.S.A.

New York Office—Singer Bldg.  
Detroit Office—Ford Bldg.

Boston Office—Oliver Bldg.  
Chicago Office and Show Rooms—618-622 Washington Blvd.

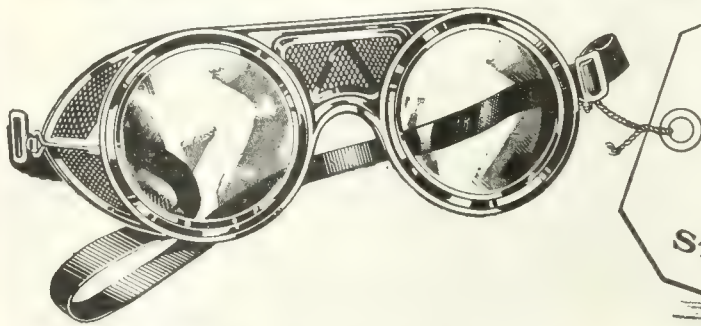
Buffalo Office—Troy Bldg.  
Cincinnati Office—Washington Bldg.

FOREIGN AGENTS: Chas. Churchill & Co., Ltd., London, Birmingham, Manchester, Newcastle-on-Tyne and Glasgow. Allied Machinery Company, Paris and Turin. Benson Brothers, Sydney and Melbourne. A. Asher Smith, Sydney. A. R. Williams Machinery Co., Ltd., Toronto, St. John, Winnipeg and Vancouver. Williams & Wilson, Ltd., Montreal.

*If interested tear out this page and place with letters to be answered.*



# Your Safety Committee Will



## STOCO CELOGLAS SHATTER-PROOF LENS SAFETY GOGGLES



When you bump into the problem of "how to get the men to wear their goggles," you'll find the **Stoco** Safety Goggle offers you a quick solution. It's comfortable. It has broad smooth surfaces bearing on the face, easy cable earbows or elastic headbands and in spite of its sturdy construction is remarkably light. Moreover, the man who is to wear the goggle will appreciate the fact that if the Celoglas lens does fracture it will stay in the frame and not fly into his eye.

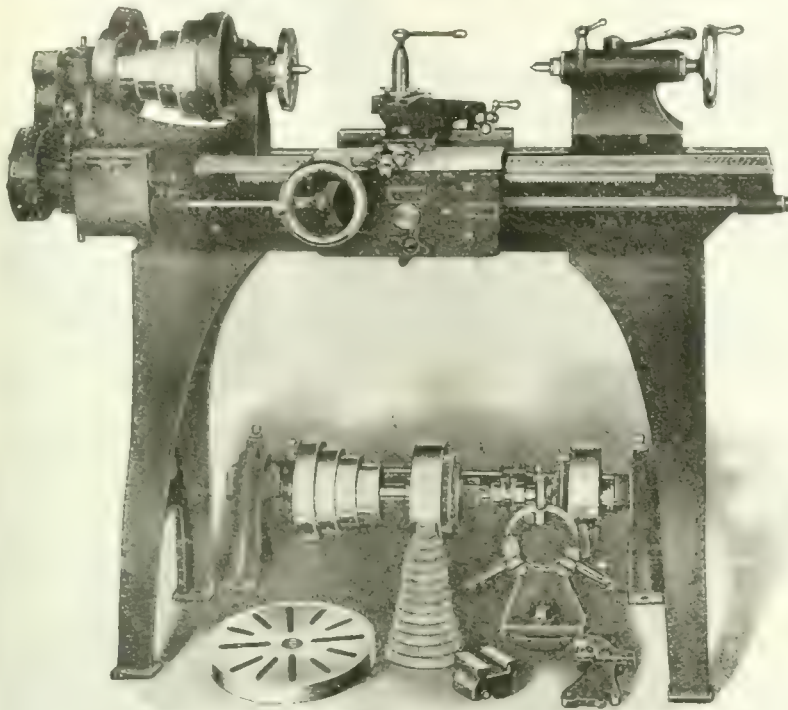
PRICE	
With Celoglas "Shatter Proof" Lenses	\$115.00 per hundred
With Clear Glass Lenses	\$ 90.00 per hundred

A sample of the **Stoco** Safety Goggle will be sent without charge to Safety Engineers, Purchasing Agents and Superintendents upon receipt of request on letterhead.

## STANDARD OPTICAL CO. GENEVA, N.Y.



# WORCESTER LATHES



12" AND 14" SWING  
CONE OR GEARED HEAD  
SINGLE PULLEY OR  
MOTOR DRIVE.

These are strictly high grade engine lathes and are especially noteworthy for their excellent design and good workmanship.

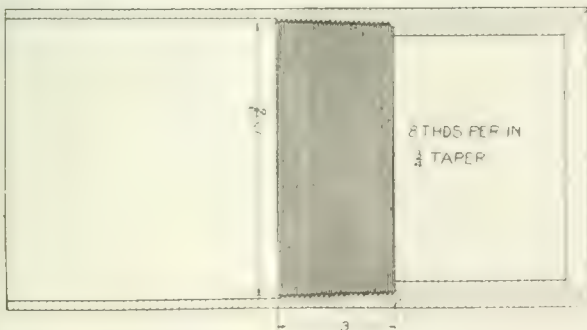
They are consistent in proportions, handsome in appearance and in accuracy and reliability they are exceptional.

Write for  
complete information.

WORCESTER LATHE CO., Worcester, Mass.

## SMALLEY-GENERAL THREAD MILLING MACHINE

*Cost-Cutter :: Time-Saver*



**Saved 29  
Minutes on  
This Job**

**Typical Operation and  
Time Study**

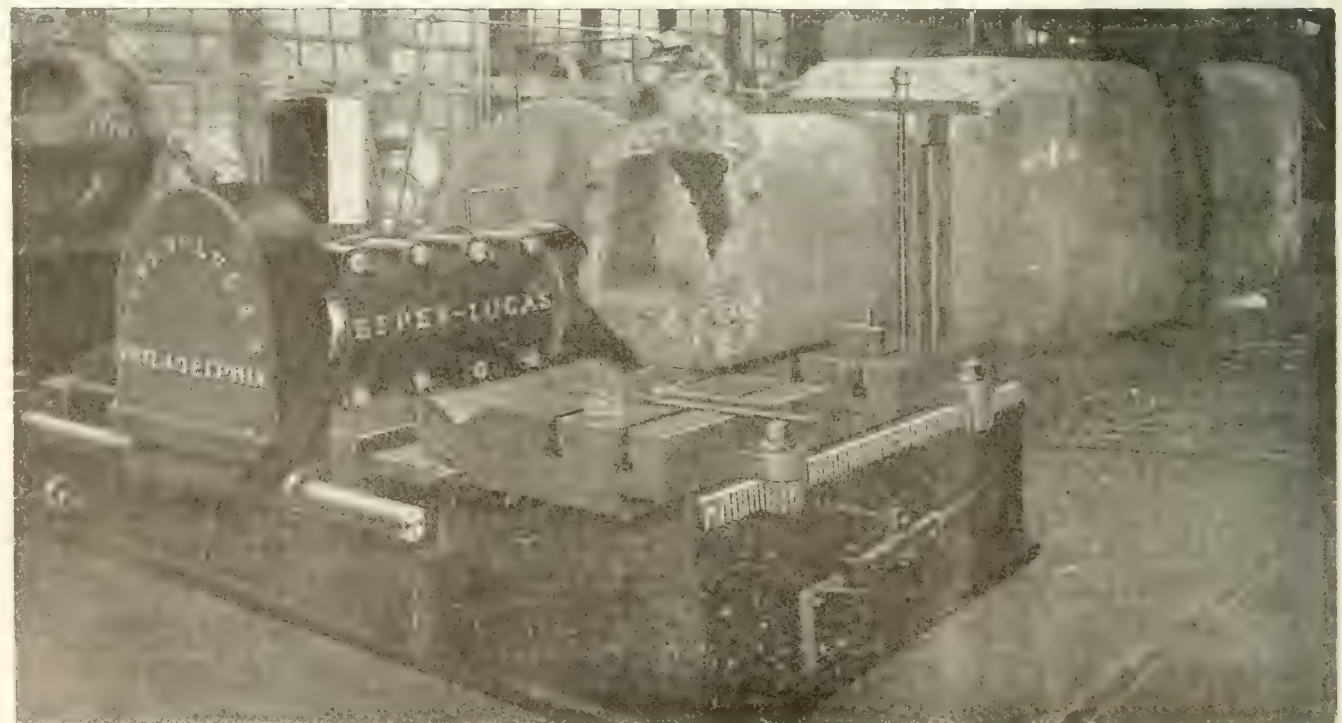
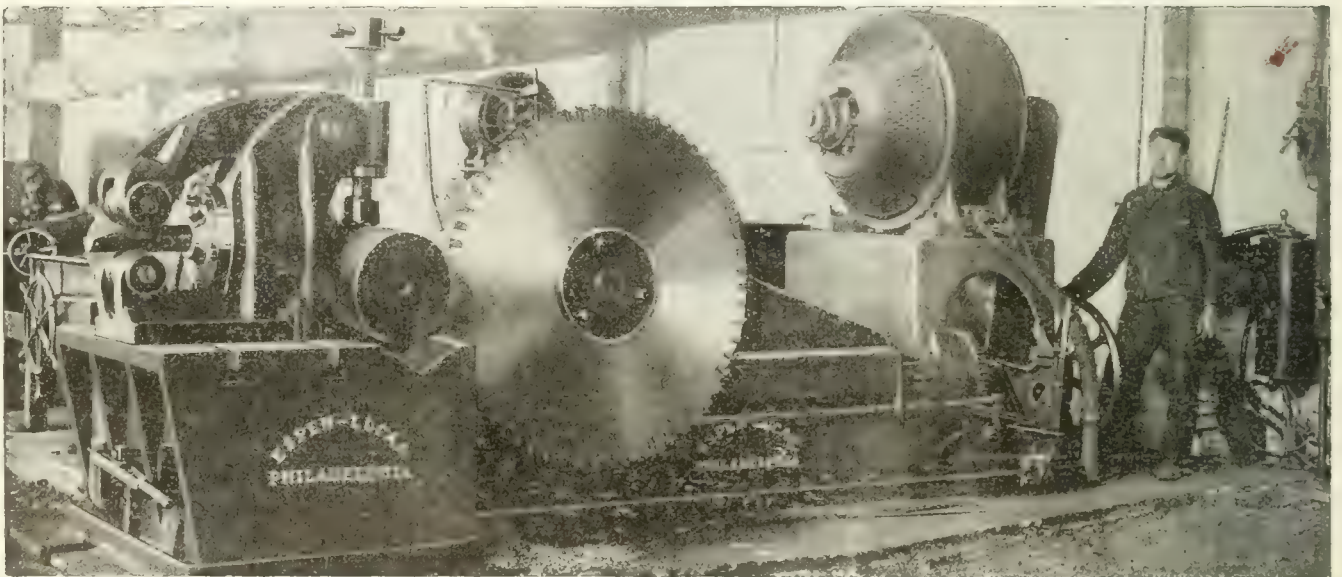
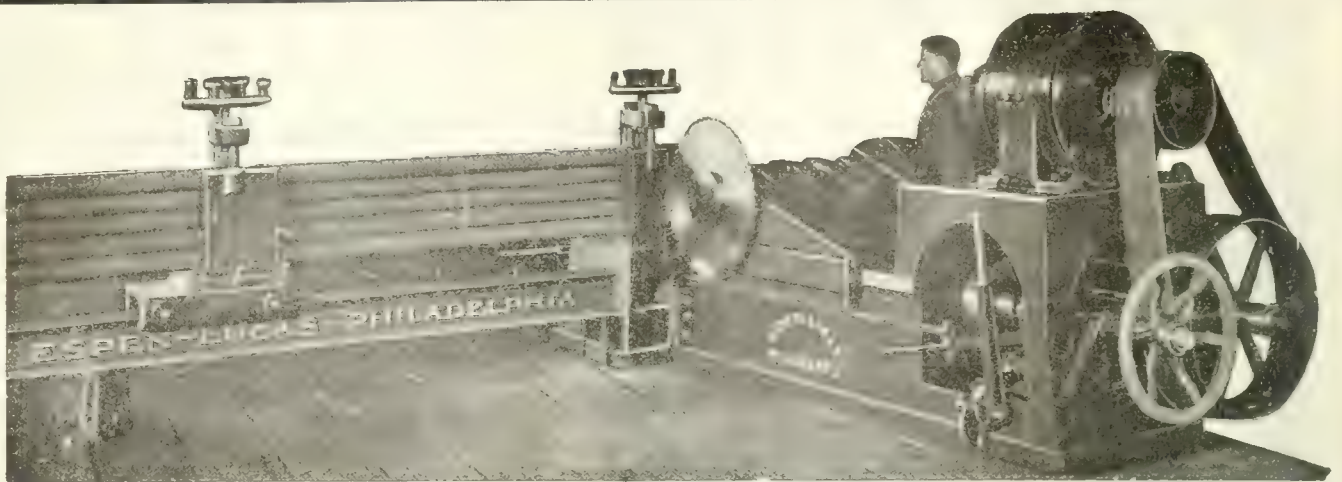
Machine—No. 1 Thread Miller.  
Piece Milled—Drive Shoe.  
Thread—16¼ inches diameter, 3 inches length,  
8 pitch, Briggs std., tapered thread.  
Milling Feed—7 inches per minute.  
Material—.55 carbon steel; air collet chuck  
used.  
Time Study—Seven minutes floor to floor for  
complete operation.  
Note—Former time, 36 minutes chasing in a  
lathe.

Are you not convinced that Smalley-  
General Thread Millers can save you  
time and expense? Let us have blue-  
prints for time study of your work.

**SMALLEY-GENERAL, Inc., BAY CITY, Mich.**

Canadian Agents: Rudel-Belnap Co., Ltd., Montreal and Toronto





**THE ESPEN-LUCAS MACHINE WORKS,** FRONT & GIRARD AVENUE  
PHILADELPHIA, PENNA., U.S.A.

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*



# TIME *the* All Essential



**S**TEAM, electricity and motors—even aeroplanes—have given the world wings to save time since ox-team days—a revolutionizing leap within a few years. The Clipper Belt Lacer has achieved an equally huge saving of time to industry.

Before "Clipper" Lacing came, the breaking of a factory belt caused a serious halt of manufacturing energy—and with it an incalculable loss of workmen's time. It used to take from ten minutes to half an hour to make even an inferior joint. To-day

## **The Clipper Belt Lacer** Laces a Belt in Three Minutes

It makes a durable joint that is perfectly smooth and flush with the belt on both sides—one that pulls better and is absolutely dependable. The "Clipper" is so simple that any workman can use it—and so important that

nearly a hundred thousand of the world's industrial plants have adopted it.

The "Clipper" goes to manufacturers on free trial. It is backed by a perpetual guarantee.

*Most mill supply dealers sell the Clipper.  
European trade supplied through London Office.  
Distributors in all parts of the World.*



## **Clipper Belt Lacer Company**

GRAND RAPIDS, MICHIGAN, U. S. A.

LONDON, ENGLAND—No 10 NORFOLK STREET

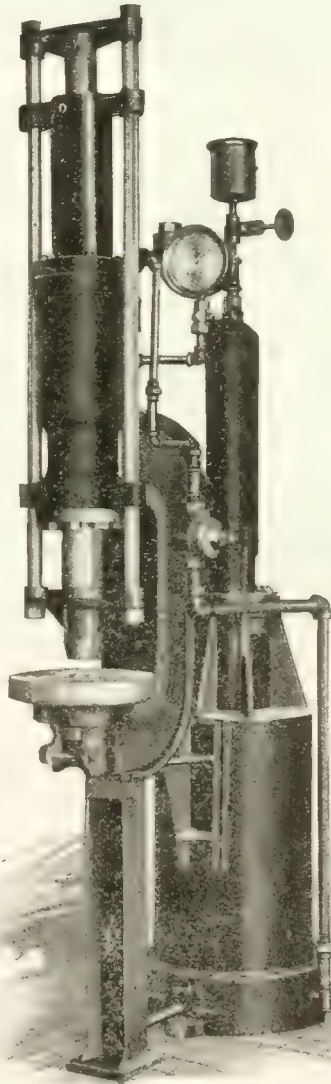


# ORIGINALITY

*is Characteristic Always of*

## "METALWOOD"

*DESIGNS and  
DEVELOPMENTS*



The "Metalwood" line of these Quick Operating Hydro-Pneumatic Presses comprises a variety of styles, types and sizes.

By performance through a period of years, these presses have established themselves in a wide range of industries as standard tools for light straightening, broaching, forcing and assembly operations.

The "R-149" style press of 20-ton capacity shown here is described in our bulletin B-47.

## METALWOOD MANUFACTURING CO.

*High Speed Hydraulic and Hydro-Pneumatic Machinery  
DETROIT, MICHIGAN*

### EXCLUSIVE SALES REPRESENTATIVES:

Canadian Fairbanks-Morse Co., Ltd., Montreal and Toronto; R. E. Ellis Engineering Co., 621 Washington Blvd., Chicago; Fairbanks-Morse & Co., Inc., 30 Church St., New York City; Sherritt & Stoer Co., Inc., Finance Bldg., Philadelphia, Pa.



# Double Production

## Another Competitive Record for DAVIDSONIZED High Speed Steel Tools

Here are the facts which speak for themselves. The name of the plant in which the record was made, will be furnished on request.

Four straddle nuts on arbor, size 6 inches by  $\frac{1}{2}$  inch.  
Material: High Manganese steel forgings.

Operation: On one machine using cutters of a standard make (not Davidsonized).

**2 minutes, 40 seconds**

On adjoining machine, using Davidsonized Cutters of same size and type, on the same operation.

**1 minute, 5 seconds**

A clear case of **more than 100% increase** in production speed through the use of Davidsonized High Speed Steel Cutters.

Furthermore, the Davidsonized Cutters, even at the increased speed, stood up to the work as many hours as the others. Thus, the increase in number of pieces per grinding was also in excess of 100%.

Tool costs, labor costs, and overhead per piece produced, all come down in the same proportion.

Through record after record of this unquestionable sort, Davidsonized Tools are being adopted by more and more of the country's foremost plants. Can you afford to wait longer before trying them out?

### THE DAVIDSON TOOL MFG. CORPORATION

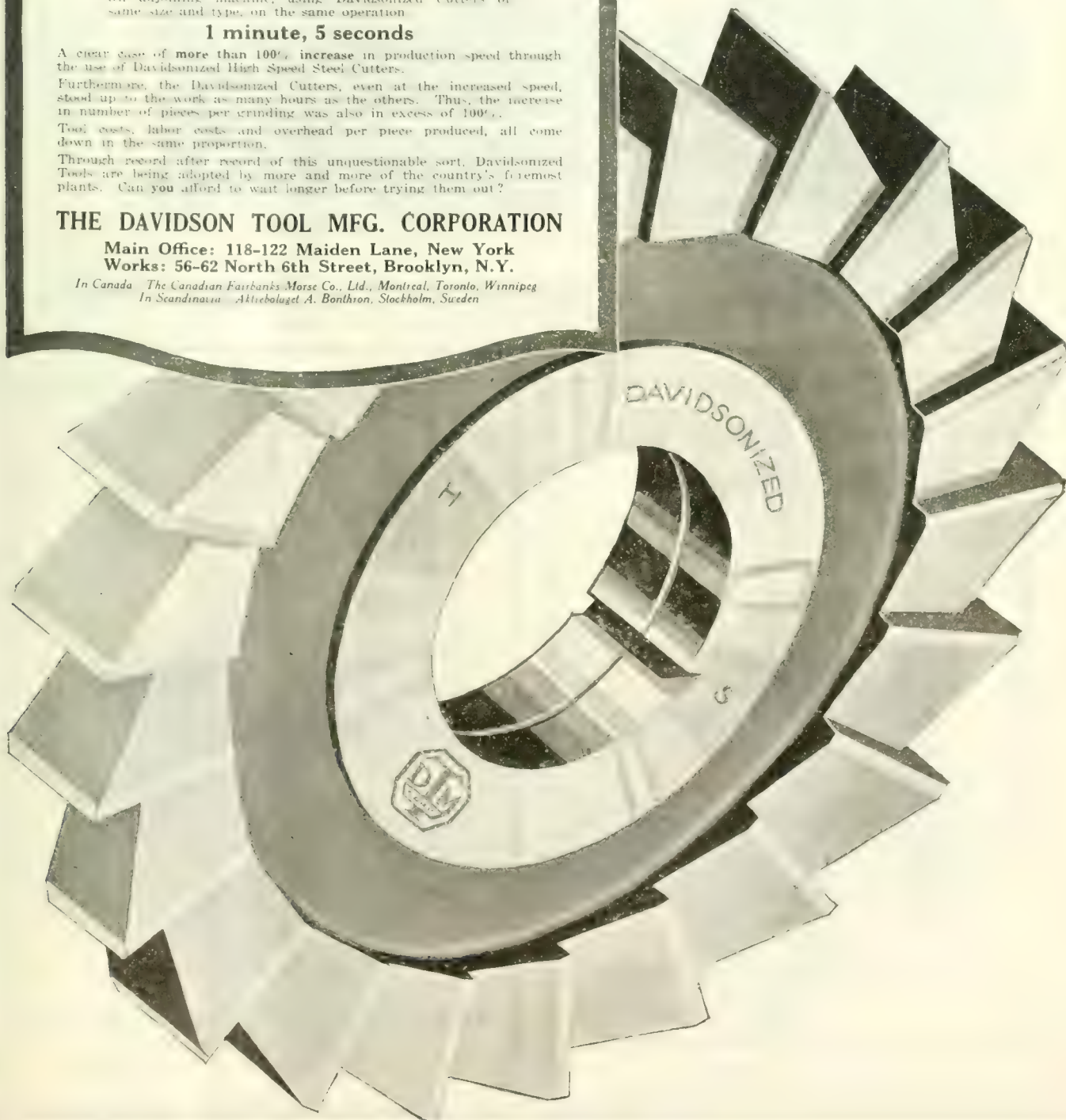
Main Office: 118-122 Maiden Lane, New York  
Works: 56-62 North 6th Street, Brooklyn, N.Y.

In Canada: The Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Winnipeg  
In Scandinavia: Aktiebolaget A. Bonthron, Stockholm, Sweden

### Special Service

*To Concerns Who Make  
Their Own Tools*

We will supply Davidsonized High Speed Steel Blanks, semi-finished to within approximately .015 to .020, either soft annealed or hardened.



*If interested tear out this page and place with letters to be answered.*

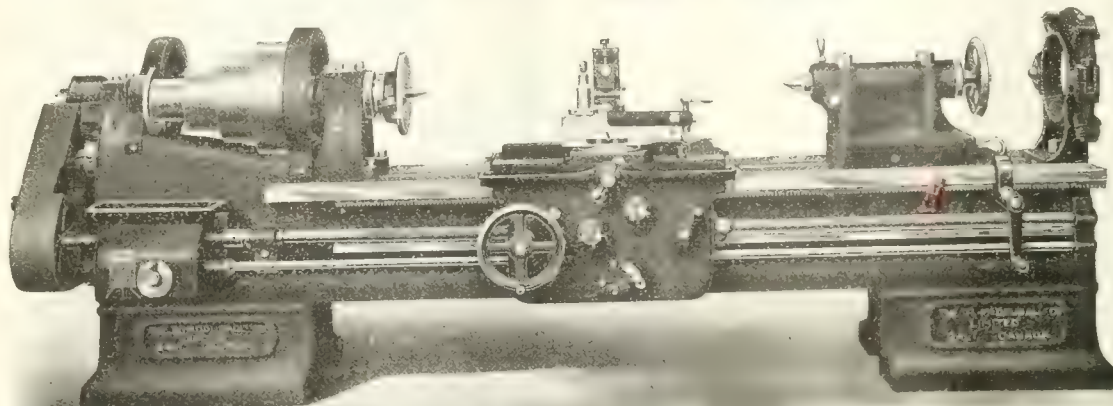




Every part of our Gap Lathes bears the "earmarks" of expert workmanship.

## McDOUGALL GAP LATHES

And every feature is proof of our aim to produce a machine of unusual merit.



Ask us to send you descriptive literature

**THE R. McDOUGALL COMPANY, LIMITED, GALT, ONTARIO**

The Canadian Fairbanks-Morse Co., Limited, Sales Agents

## Every Emery Wheel With Its Own Dresser



Desirable, isn't it, now that cost is no objection? For with an inexpensive Desmond-Stephan Dresser for every wheel, every wheel will be touched up frequently and so kept true and equal to its original cutting efficiency.



For all ordinary shop grinding wheels specify "Diamo-Carbo"—the perfect diamond substitute.

For large, coarse, hard wheels ask for the "Desmond-Huntingdon."

Sherman Corrugated, 2 sizes  
Norton Zig-Zag, 2 sizes  
Magazine  
Diamonds

The Desmond-Stephan complete line of Economical Grinding Wheel Dressers is catalogued. Write for copy.

**The Canadian Desmond-Stephan Mfg. Company**  
HAMILTON, ONTARIO

Alfred Herbert, Limited, Coventry, Agent for Great Britain



## Forgings, Stampings or Pressed Steel Parts

An attractive catalogue showing the facilities this company has for producing Forgings, Stampings and Pressed Steel Parts—particularly in large quantities—sent on request.

**Dominion Forge & Stamping Co., Ltd.**

WALKERVILLE, ONTARIO

Toronto Office: 206 Excelsior Life Bldg.



# THERE IS "A REASON WHY"

When Germany signed the Armistice, Walcott Lathe Company accepted cancellations of orders for Lathes amounting to hundreds of thousands of dollars. Not one cent of damage from the United States Government or anyone else was claimed on account of the cancellation.

## YOU SAY, WHY

Because Walcott Lathes are standard equipment throughout. They are built and designed for manufacturing purposes in sizes to meet every requirement of your shop. Thus, we have had a constant increasing demand for Walcott Lathes for the past thirty-eight years, not from one section of the country, but from all over the world. Our business is good, and our plant is running full time, not a man idle.

If you are interested in new Lathes, specify the WALCOTT, and you will find by their many advantages "The Reason Why."

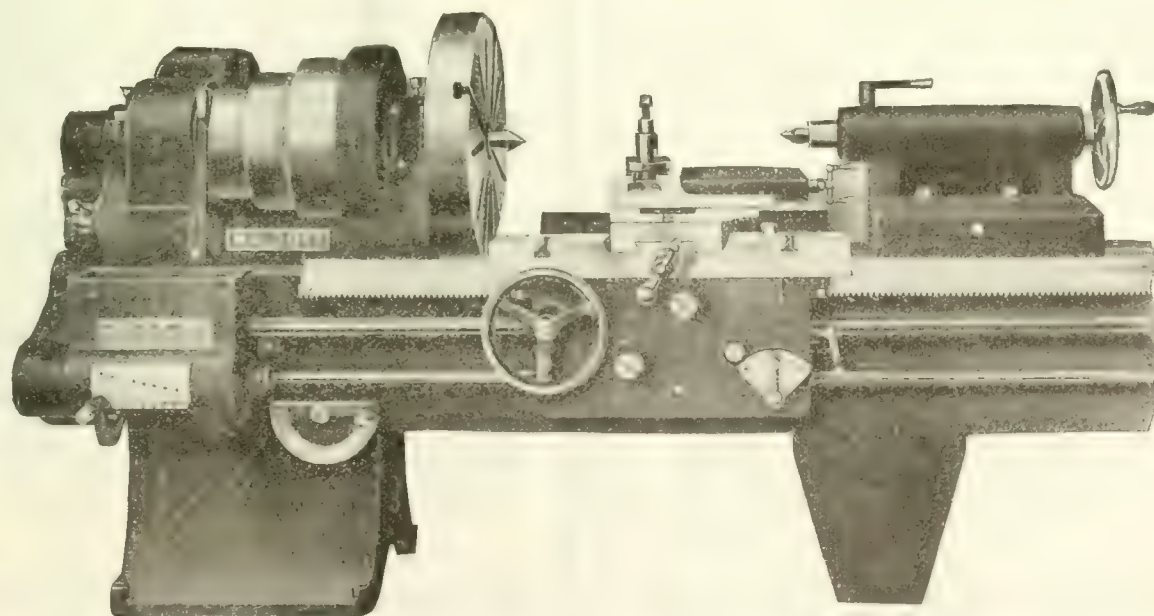
## WALCOTT LATHE COMPANY

*Engine Lathes*

140 Calhoun Street

JACKSON, MICHIGAN

AGENTS:—Hill, Clark & Co., Chicago, Ill. Frevert Machinery Co., New York City, N.Y. W. E. Shipley Machy. Co., Philadelphia, Pa. National Supply Co., Toledo, Ohio. Motch & Merryweather Machinery Co., Pittsburgh. H. A. Smith Machinery Co., Syracuse, N.Y. Wm. E. Duff, York, Pa. Wm. E. Duff, Jacksonville, Fla. Brown-McDonald Machy. Co., St. Louis, Mo. Smith-Booth-Usher Co., Los Angeles, Calif. Hendrie-Bolthoff Mfg. Co. & Sup. Co., Denver, Col. Gordon & Finkbeiner, Portland, Ore. Northern Machinery Co., Minneapolis, Minn. Brownell Machinery Co., Providence, R.I. Chas. A. Strelinger Co., Detroit, Mich. Marshall & Huschart Machinery Co., Indianapolis, Ind. Fenwick, Freres & Co., Paris, France. Buck & Hickman, Ltd., London, England. Parke & Lasey Co., Sydney, N.S.W. Standard Machy. & Supplies, Ltd., Montreal, Que. Canadian Fairbanks-Morse Co., Ltd., Toronto, Ont.



*If interested tear out this page and place with letters to be answered.*



## Note On Grinding

NORTON COMPANY WORCESTER, MASS.

No. 67A

### Ten Suggestions on Saw Sharpening

1. The success of saw and knife grinding lies in the selection of the right grinding wheel.
2. Soft bonded wheels cut quicker and glaze less than hard wheels. They do not last as long as hard wheels, but produce more work in a given time and are a better investment than hard wheels as they will not case-harden or burn.
3. The proper wheel for the work holds its shape without frequent dressing and cuts freely without tendency to glaze or fill.
4. Keep the face of the grinding wheel true.
5. The grinding wheel of the correct grain and grade running at 5,000 surface feet per minute is the right wheel to use. If a wheel glazes and is found to be running more than 5,000 surface feet, reduce the speed accordingly. If a wheel wears out rapidly and is found to run less than 5,000 feet, increase the speed accordingly.
6. Increasing the speed of a grinding wheel gives the effect of a harder wheel. Decreasing the speed gives the effect of a softer wheel. Every saw filer should have a speed indicator.
7. Dressing is not truing but sharpening the wheel. Excessive dressing wears faster than grinding. When too much dressing is necessary it is an indication that the wheel may be too hard, or is running at the wrong speed.
8. The pressure of the grinding wheel should be light on the work. Over-pressure does not produce rapid cutting but is liable to cause glazing of the wheel and burning of the teeth. Better and faster results are obtained by light pressure.
9. A wheel that is too fine works with about the same results as a wheel that is too hard.
10. Be sure your machine is free from vibration before you condemn the wheel.

NORTON COMPANY

Canadian Agents, The Canadian Fairbanks-Morse Co., Ltd., Montreal,  
Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon,  
Vancouver, Victoria. F. H. Andrews & Son, Quebec, Que.

Grinding Wheel Plants, Worcester, Mass.

Electric Furnace Plants	New York Store	Chicago Store
Niagara Falls, N.Y.	Chippawa, Ont.	11 No. Jefferson St.
	Detroit Store, 73-75 W. Congress St.	



## Mark Your Products The "Matthews" Way

### STEEL LETTERS AND FIGURES

In shops where the highest standards are maintained the stamping equipment is generally "Matthews Made."

Matthews Letters and Figures are hand made from carefully selected steel, heat treated for hardness, insuring long service under hard usage. They make deep, clean-cut impressions that outlast the product.

Mark your next order for steel lettering, dies or stamps—"Matthews Made."

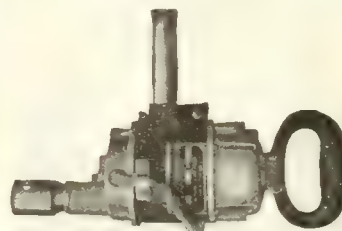
### Canadian Fairbanks-Morse Co., Limited

Montreal, Toronto, St. John, Quebec, Ottawa, Hamilton  
Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria

Jas. H. Matthews & Co. - Pittsburgh, Pa.  
STEEL LETTERING DIES AND STAMPS

## U. S. Electric Drills and Grinders

Save Time, Labor and Money



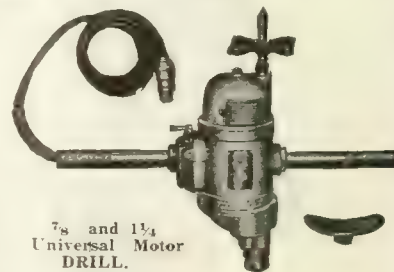
3 SIZES

3-16 in., W.G.T., 6 lbs.  
1/4 in., W.G.T., 9 lbs.  
3/8 in., W.G.T., 12 lbs.

All motors wound for  
110 or 220 volts.

Direct or alternating  
current.

Try a few of our  
Electric Drills and  
Grinders and you'll  
send us an order for  
more. Our guaran-  
tee protects you.



7/8 and 1 1/4  
Universal Motor  
DRILL.

For Sale By

The Canadian Fairbanks-Morse Co., Limited

Montreal, St. John, N.B., Toronto, Winnipeg, Calgary,  
Vancouver

THE UNITED STATES ELECTRICAL TOOL CO.  
CINCINNATI, OHIO



## A Rugged Pulley-Gripper

There is nothing like leather for belting, and SparOak Leather Belting has peculiar advantages all its own.

SparOak is a two-in-one belt combining rugged strength with unique pulley-grip. Its great endurance and minimized slip make it a double-service belt of unusual qualities.

Two kinds of leather enter into a SparOak Belt. The outer ply is oak tanned, cut from the best selected center stock. The ply next the pulley is Graton & Knight Spartan leather, tanned to give pliability and traction power unequalled by any other material.

# SparOak Belting



Here is an 18" SparOak Belt on a hard drive in a warm, moist atmosphere where the extreme flexibility of Spartan and the firmness of Oak leather are necessary.

SparOak is the answer to a great many perplexing belt problems, saving power and standing up under the most severe conditions.

If you have a troublesome belt drive, consult us as to what belt is required. Maybe it is SparOak, but in any event one of the Graton & Knight Standardized Series of Belts will fit exactly. Write for our booklet on Standardized Belting.

SparOak Belts grip from the start. During the weeks most new belts take to "work in," a SparOak Belt is giving full power and keeping production up to normal. And SparOak Belts keep on gripping for years under adverse conditions. They withstand repeated shifting, and the wear against step cone or flange pulleys. They render efficient service on drives with high speeds, small pulleys, and heavy loads. In short, any of the factors that quickly wear out ordinary belts affect SparOak belting amazingly little.

**CANADIAN GRATON & KNIGHT, LTD.**  
Montreal, Canada

Canadian Representatives: The Canadian Fairbanks-Morse Co., Ltd., St. John, Montreal, Ottawa, Toronto, Hamilton, Quebec, Calgary, Saskatoon, Vancouver, Windsor, Winnipeg, Victoria

**Graton & Knight**  
Standardized Series  
**Leather Belting**

MADE IN CANADA

Tanned by us for belting use

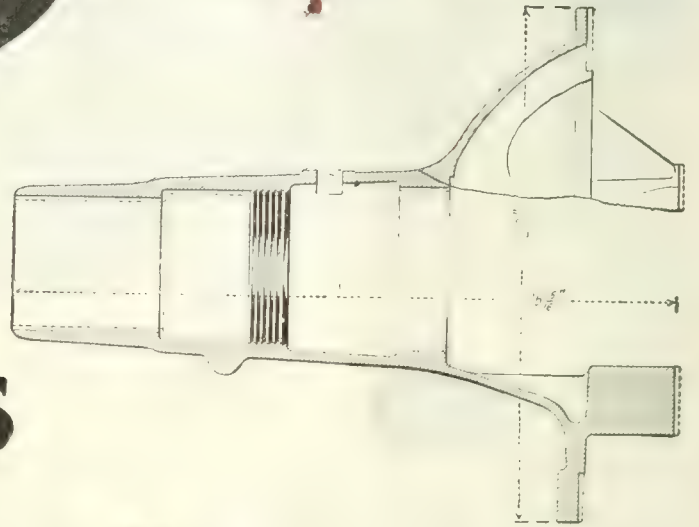
MADE IN CANADA

*If interested tear out this page and place with letters to be answered.*





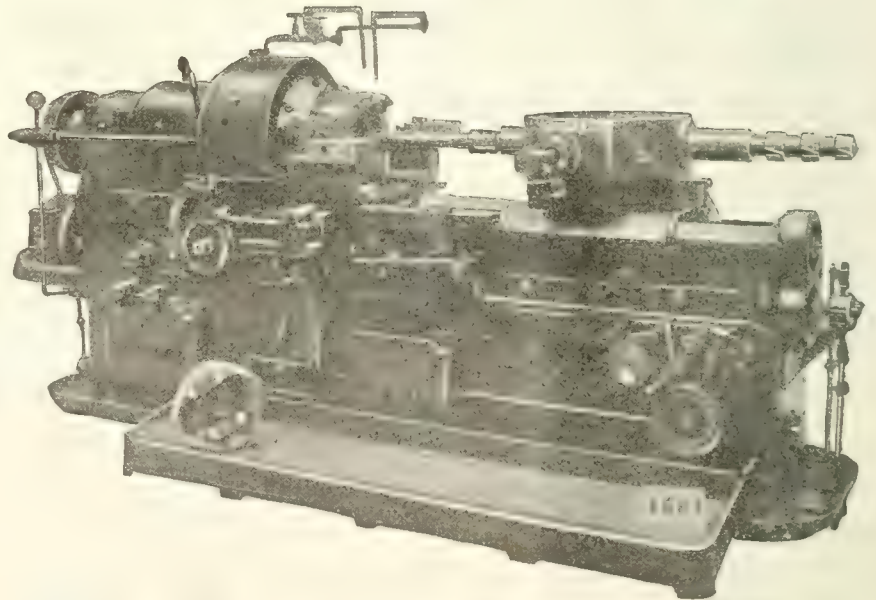
# Eight Minutes



The Gisholt Automatic time for machining this Differential Carrier is eight minutes.

When you buy Gisholt Automatic Turret Lathes, you invest in minutes saved; you are actually buying profitable production.

If you have any Automatic Chucking work, let us tell you how the Gisholt Automatic will cut your costs.



**GISHOLT MACHINE COMPANY, 1201 EAST**

*Builders of Standard and Automatic  
Boring Mills, Tool Grinders,*

**Eastern Sales Office: 30 Church St., New York.**

CANADIAN AGENTS: The Canadian Fairbanks-Morse Co., Ltd., St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria.



# GISHOLT

## Operation Is Reliable

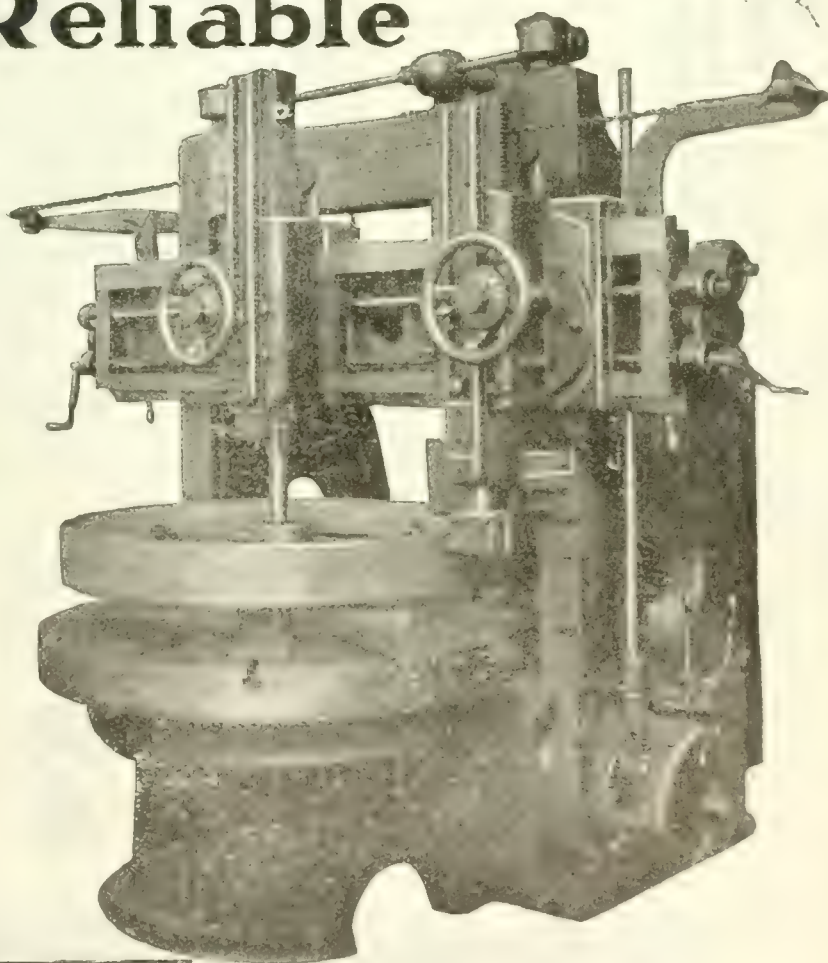
**Economy is Sure  
Results are Certain**

Gisholt Vertical Boring Mills  
yield returns which steadily  
pay back your investment.

Start them working for you  
and capitalize our years of ex-  
perience built into every part.

Tell us the sizes your work re-  
quires and to whom data  
should be sent.

*Gisholt Methods  
Insure  
Accuracy Economy*



**WASHINGTON AVE., MADISON, WIS., U. S. A.**

*Turret Lathes, Vertical and Horizontal  
Small Tools, Special Machinery, etc.*

**Works: Madison, Wis., Warren, Pa.**

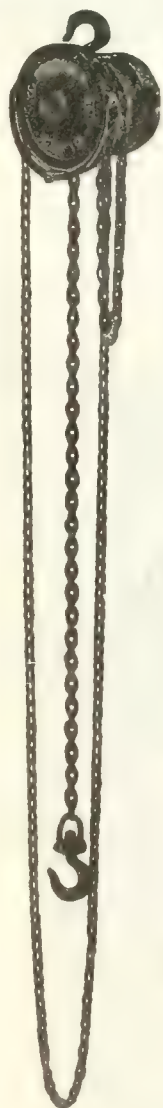
**CANADIAN AGENTS:** The Canadian Fairbanks-Morse Co., Ltd., St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria.



# THE CANADIAN Fairbanks-Morse

## EVERYTHING MECHANICAL

### Machine Shop Supplies



Yale Triplex Blocks  
Norton Grinding Wheels  
Wells, Taps, Dies and Gauges  
Cleveland Drills and Reamers  
Brown and Sharpe Tools and Cutters

**Every Shop Requisite**  
Bench Tools—Lathe Tools  
Blacksmith's Tools—Carpenter's Tools  
Power Transmission—Goods Conveyors  
Anything you want—at a reasonable price

Our stocks are the largest in Canada



## The Canadian Fairbanks-Morse Co., Ltd.

*"Canada's Departmental House for Mechanical Goods"*

Halifax   St. John   Quebec   Montreal   Ottawa   Toronto   Hamilton   Windsor   Winnipeg  
Saskatoon   Calgary   Vancouver   Victoria



# CANADIAN MACHINERY AND MANUFACTURING NEWS

Vol. XXI, No. 13.

October 2, 1919

## Making the "Hall" Line of Pipe Machinery

By J. H. MOORE, Associate Editor  
Canadian Machinery

A Brantford Industry  
Which Has Shown  
Remarkable Growth  
and Progress in Re-  
cent Years.

Four Brothers With  
One Aim, Namely, to  
Turn Out the Best  
Line of Pipe Machin-  
ery Possible.

**T**O get properly enthusiastic over anything, you must first get cause for that feeling of enthusiasm. Nothing creates such a feeling quicker than a like enthusiasm on the part of the person, or persons, describing some particular operation or system of manufacture, which brings the writer up to the point where he will describe his visit to the plant of John H. Hall and Sons, Limited, Brantford, Ontario.

The moment he entered the plant he was struck with the earnest spirit of enthusiasm pervading the atmosphere. Here was a plant manufacturing a product which it not only thoroughly believed in, but was willing to guarantee to the limit. "When we send goods out of the shop, we do not by any means consider that the end of it," commented Mr. L. S. Hall, "but rather the starting point of our interest, for we have been, and are even more so than ever, following out the policy to check up closely the career, as it were, of our machines. We watch and inquire carefully into how they please, and stand up to their work, and I am glad to say," he concluded, "that the results are very gratifying."

Before going into the methods of this firm any further, it might not be amiss to give readers a short history of this concern, how it started, and its war-time record.

### How It Started

The start was made as far back as seventeen years ago, in the same place, namely, Brantford, Ontario. At that time, J. H. Hall, the founder of the concern, was president and general manager, and together with his four sons, L. S., E. W., E. L. and A. R. Hall,

respectively, he launched out as a manufacturer of special machinery. Screw cutting machines for the John Morrow Co., were amongst their first orders, and also special pipe machines for the Page Hersey Co; pipe benders, straighteners, etc., were also manufactured during this period. The idea, however, kept to the fore was the developing of their line of pipe machinery, improving this in every way possible, in order to keep not only abreast of the times, but ahead of them.

When war broke out, there commenced an enormous demand for cutting off

machines. This firm stepped into the breach, and made certain changes to their pipe machines which turned them into at least a good temporary cut-off machine. But the demand for a special machine grew so insistent that work was commenced on designing one. A point worthy of note, is the fact that they do their own designing; Mr. L. S. Hall being the brother with the designing qualifications.

He promptly got to work with the result that a special rugged machine, equipped with ball thrusts, friction clutch and air chuck, was soon on the market, and in great demand. During last year over a quarter of a million dollars' worth of business was handled by this concern. From the start of war 1,400 machines were sent out, and in many cases exported, one case in point being the sending of a 12 in. machine expressed to Moscow in Russia, during the submarine scare. This is about the only case where the Hall Brothers admit, they haven't followed up the career of their machine. A notable feature showing speed which was exhibited, is as follows: that three weeks after the placing of the first order, the first machine was shipped.

But to continue a little more on the personnel of the firm. The father, John H. Hall, who established the business in 1902, lived to see the concern grow to splendid proportions, but passed away suddenly in Los Angeles, a short time ago, at the age of 67, leaving the business in the hands of his sons, who had so splendidly helped the good work along. It might be well to add that three of these sons are all practical mechanics,

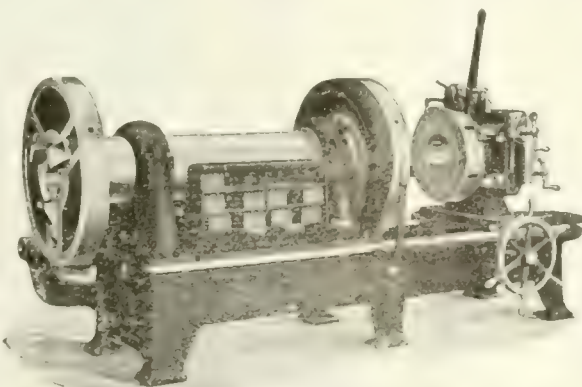
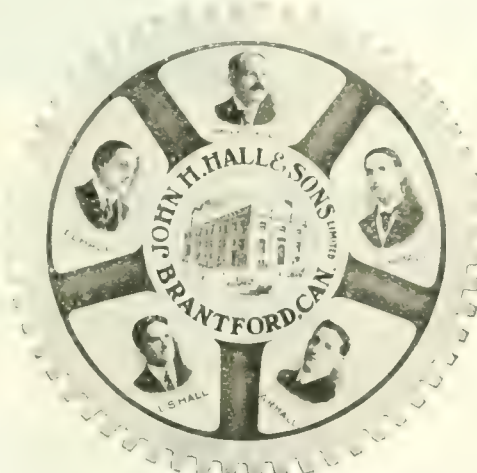


FIG. 1 THE MACHINE AS IT IS NOW BUILT.





the other being the business spoke in the wheel. Speaking of wheel, gives us an excellent opportunity to show this firm's novel trade-mark, which was designed by L. S. Hall himself.

In each of the spokes is placed a photograph of the brothers, together

But now, refer to Fig. 2 and see the difference.

#### A Comparison

Where before, the cone pulley and

The lever operating these gear changes come out as shown on photo, within easy reach of the operator, and all the different changes obtainable are

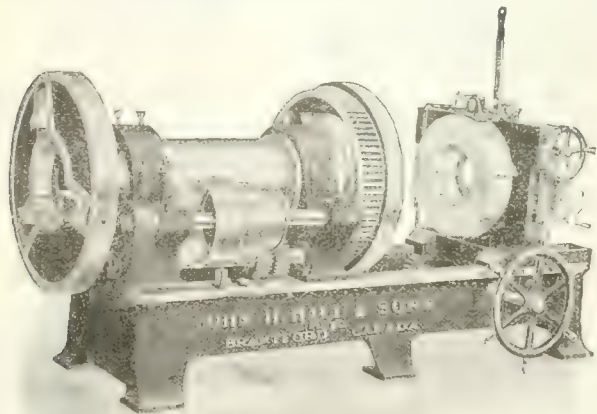


FIG. 2—THE MACHINE AS IT USED TO BE BUILT. (NOTE THE DIFFERENCE AND READ THE TEXT.)

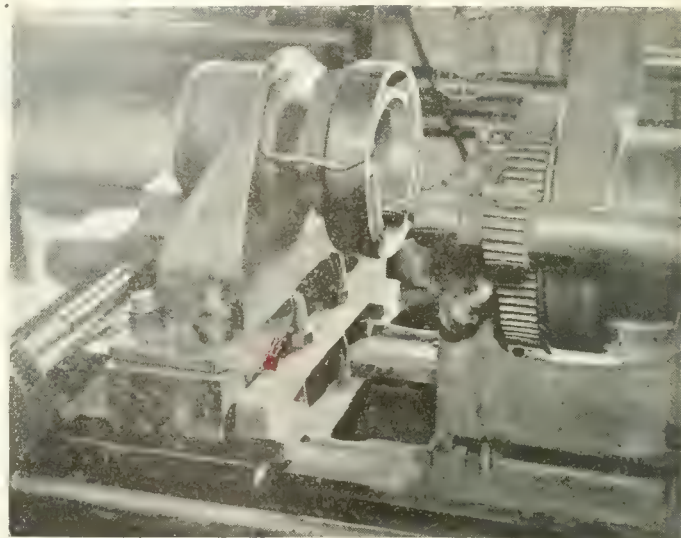


FIG. 4—MILLING THE CAMS ON THE DIE HEADS.

with the founder of the business. The novelty of this trade mark alone defies its being copied. At the death of J. H. Hall, a shake-up was made in the positions, and following is present duty of individuals mentioned: Mr. L. S. Hall, president and general manager; Mr. E. W. Hall, secretary and treasurer; Mr. E. L. Hall, director; Mr. A. R. Hall, vice-president; Mr. E. L. Williams, office manager and director.

#### The Actual Manufacture

So now since having placed before readers the inside history, as it were, let us proceed to consider the actual manufacture of their line of pipe machinery.

Pipe lathes, rapid nipple machines, rapid upright roller pipe cutters and special machinery for the tube mills about cover their regular line, but we will chiefly interest ourselves in their pipe threading lathes. Those machines are made in various sizes, from the hand machines up to the enormous capacity of 18-inch pipe. Two of these huge machines are at present under construction.

Their smallest power machine has a capacity up to 2 inch, while they next range as follows: No. 4 Simplex, No. 4 Standard Improved, No. 6 Standard Improved, No. 6 Duplex Improved, No. 8 ditto, Nos. 10 and 12, ditto. Then, of course, comes any larger size desired, such as 16-inch, 18-inch, etc. To go over all their lines in detail would be impossible, but one thing that impressed the writer was the compactness, yet absolute rigidity of these machines. All gear changing levers are within easy reach of the operator, and driving pulley is entirely out of his way.

Perhaps the best way to point out what the writer refers to, would be to compare Figs. 1 and 2. At Fig. 1 we see the machine as this firm used to build it. Note: the driving pulley and gears all exposed, and very much in the way.

gears stood in the way, we find these placed entirely out of the way. In their place is a convenient cabinet for storing the dies used on the machine. The advantage of such a cabinet is self-apparent. There is also a small pocket cast on the side of this cabinet to hold orders, etc., that the operator might need to refer to. In other words the operator is considered at all times in the design.

The gears are also totally enclosed, and run in oil, which is a great improvement over the former method.

plainly marked, in order that the operator cannot get confused. A single drive pulley is placed at the back of the machine, on a special drive shaft. A friction clutch is also installed in connection with this pulley. Such a scheme allows the operator to turn the spindle head around a very short distance when desired. A feature such as this needs no comment to impress readers with its benefits, for the lack of this feature has been a serious drawback so far.

There is also a rotary gear pump on the rear of machine. This pump is re-



FIG. 3.—PLANING THE BED OF A DUPLEX PIPE LATHE.



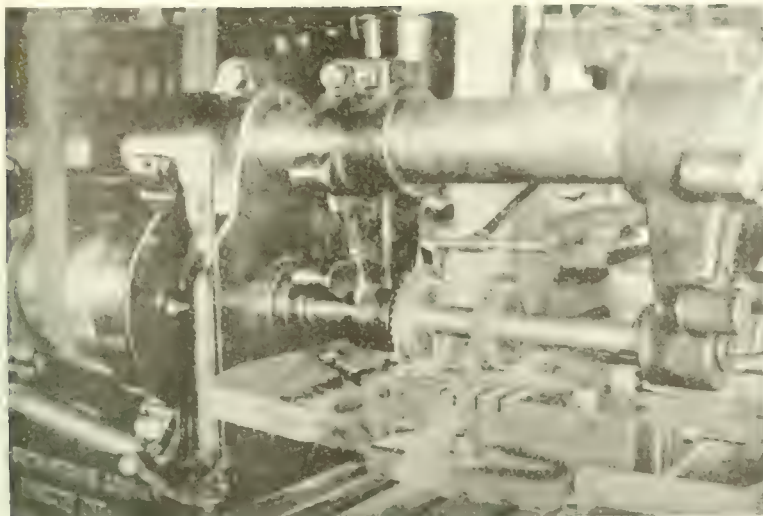


FIG. 1 MILLING THE DIE BLANKS WITH A FORD-SMITH MILLER

versible, so, of course, it does not matter whether you are cutting right, or left hand threads, the pump will work equally well.

All spindles are self oiling, and the main spindle bearings are oiled from a chain which runs at all times in a well of oil. This feature is obtained through the design of the bearing and caps, which have a hollow core to accommodate the oil and chain. Interchangeable bronze nuts are furnished in all jaws of machine.

Micrometer adjustment is arranged for in the die head, also a special ar-

rangment for centering the pipe. There is also a cut-off tool, and reaming tool, in connection with the die head on the large size machines.

To enumerate all the points of design would occupy too much time and space, suffice it to say that each point throughout these machines has been carefully thought out, and designed with the idea in mind to make them as far as possible in a class by themselves.

Of course, as the reader will understand, these machines can be fitted up with motor drive, in fact, in many cases, this is done and the machine is designed

with this idea in mind. To place a motor on these machines is not a case of afterthought, for there is a pad, and special bracket, so arranged that when desired this method is installed.

It might be well at this point to show by illustration some of the operations on these machines.

#### Planing the Bed

At Fig. 3 we see a bed for one of their duplex pipe lathes being planed. There are a few points to which the writer would call your attention. Note how the bearings for the gear box are all self-contained in this bed. Directly below these bearings there is a trough, which holds the oil in which the gears run. Another feature is the trough shown on the side of the bed. This trough or tray catches all the oil drips, which would have a tendency to run down the side of bed, giving it a sloppy appearance. By means of this tray the machine is always kept looking neat and clean. One other point in connection with this bed, is the fact that all points slope toward the centre, that is, such points where oil would strike. In this way the oil all runs to the centre of machine, and later passes through two drain holes, with strainer attached. In this way the same oil can be used over and over again, yet is always clean and free from cuttings.

The other points of interest in this photograph can easily be ascertained by a study of the photo.

#### Milling the Cams on Head

Another of interest is shown at view at Fig. 4. Here is a novel fixture designed to mill, on the lathe, the die



FIG. 6 HOBING A SET OF DIES ON SPECIAL FITTED LATHE

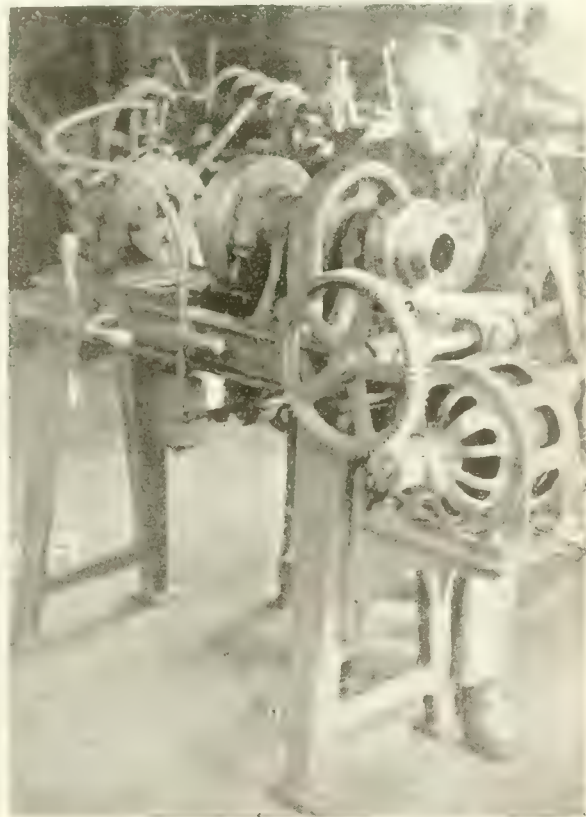


FIG. 7 ASSEMBLING A SMALL MOTOR-DRIVEN MACHINE.



heads, which have three, four or six peculiar shaped cams, as the case may be, on their face. The one illustrated has three such cam shapes. This lathe has been specially rigged up to take all sizes of these heads, and is fitted with worm drive at back, connected to the saddle. Of course, this feeds the saddle crosswise at a certain speed, depending on the cutter, and cam being machined. Different plates are placed on master cams, to suit conditions. High speed cutters are used and one operator runs three machines. Readers can, by studying this picture, follow further its various details.

In Fig. 5 we see a Ford-Smith miller busy at work on die blanks for these machines. Four cutters are used, two slitting and two lipping cutters; of course, the two lipping cutters mill the lip on the die blank, while the slitting cutter cuts them off.

### Hobbing the Dies

Fig. 6 shows the operator at work on the hobbing out of a set of dies. This operation is a very important one, and is performed in a very creditable manner.

The die blanks are placed in a specially constructed jig as shown, and a special saddle has been constructed to hold the milling cutter, which is made of first-class high speed steel.

The driving mechanism for the head is also special, being a worm drive to reduce the head speed to suit. These dies are now cut with special care, for after all is said and done, the dies are the

main portion of the machine. Pure lard oil is used, and the dies are hobbled at a very slow speed to ensure absolute accuracy. Approximately 6 hours is occupied in the cutting of a set of dies.

Readers will notice that this machine is also a lathe converted for this special purpose.

The hardening of the dies is also an interesting study. A special chart has been made, based on what has been found best for each particular purpose, and this is strictly adhered to. Pyrometer, etc., etc., form a part of this hardening department.

At Fig. 7 we see a smaller machine with motor drive attachment being assembled. Readers can readily grasp the compactness and general appearance of this machine from the photograph.

Throughout this article the writer has endeavored to emphasize the fact that the work on these machines is carried out with extreme care, and before going on to the next portion of this article it will be well to lay stress upon the fact that no work is passed through the shop except perfect in every detail.

And now a word as to the service schemes instituted by this firm.

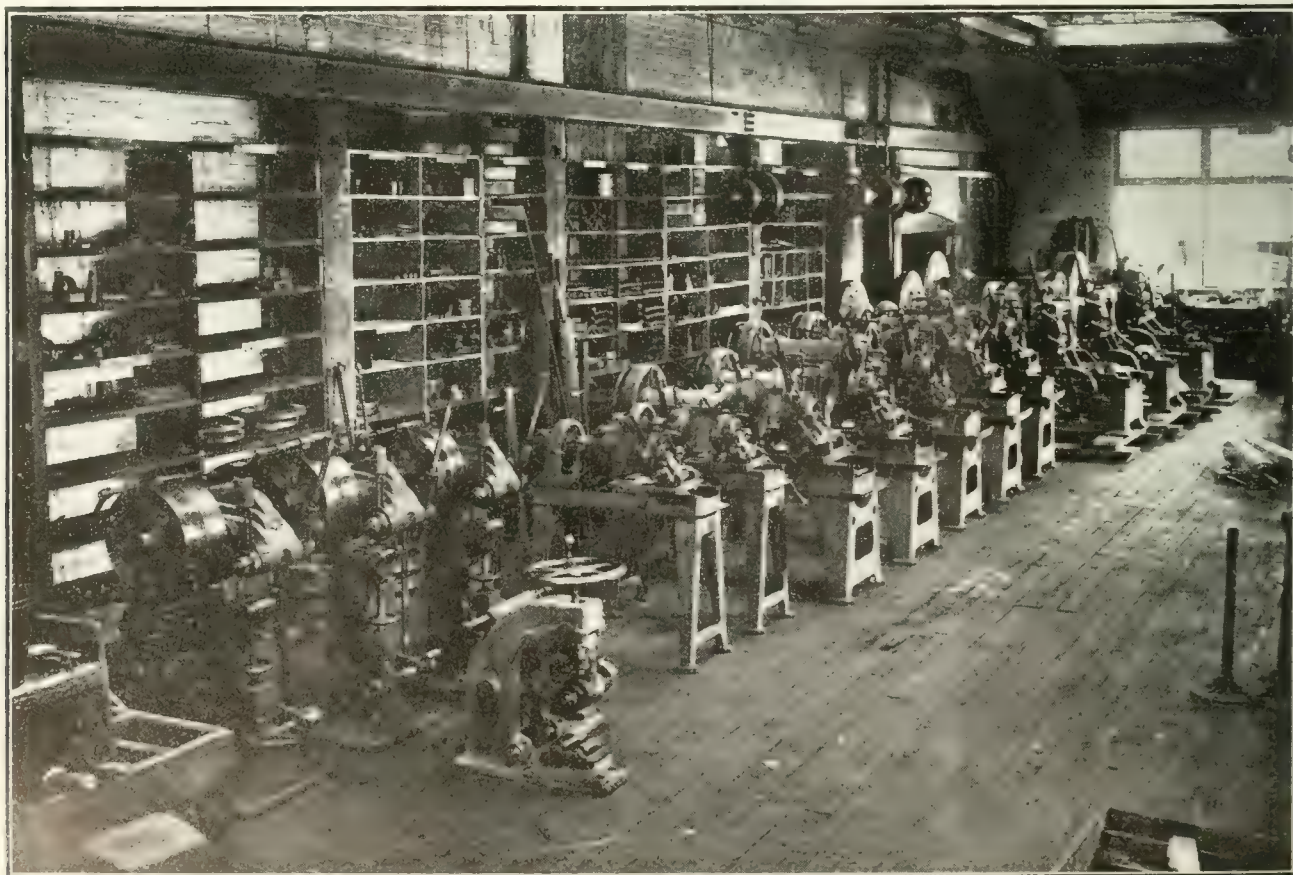
As stated before, they do not consider their obligations ended by the sale of a machine, but they follow up its subsequent performance. They know that the die problem is a large one, in fact, that it is the main problem, and so to cope with this as far as possible they have issued a bulletin entitled: "How do your dies die"? In this pamphlet, with

such a novel heading, they go on to describe first—questions you should ask yourself—for instance: "What production am I getting from my dies?" etc., etc. All these questions are real practical ones, met with every day. They then show photographs of dies improperly ground and show why you cannot get results from such dies. They last of all tell you how to secure the maximum production and make up a chart, strictly for the man on the machine to work from.

They also issue a chart, showing every part of their machine, so that anyone can easily get familiar with all parts. Numerous other service bulletins are on the way, and as Mr. L. S. Hall told the writer, "our aim is to make our service practical and worth while."

Perhaps the best method of concluding an article of this nature would be to quote a little statement, made by L. S. Hall himself, which he mentioned in an off-hand way to the writer. "I have always had a pet hobby," he said, "to feel that whatever I designed was a step above any former effort, and I also felt that a business, to succeed, must not only give the customer all that he expects, but a little more."

It is this policy that is making them feel cramped in their present quarters in spite of the addition made to their plant during wartime, and it's a safe bet that there will soon be another addition added if the present policy of this company continues, as it will, of course, so long as the present executives hold office.



A GENERAL VIEW OF MACHINES HELD IN THE SHOP FOR EXHIBITION AT THE RECENT C. A. S. E. CONVENTION AT BRANTFORD.



# Description of a Mahr Calorizer and Furnace

Oil Burning Furnaces For Forging and Heat Treating Purposes Are Rapidly Becoming the Usual Installation in the Industrial Plant of To-day. This Describes One Such Furnace

By J. H. RODGERS, Associate Editor Canadian Machinery

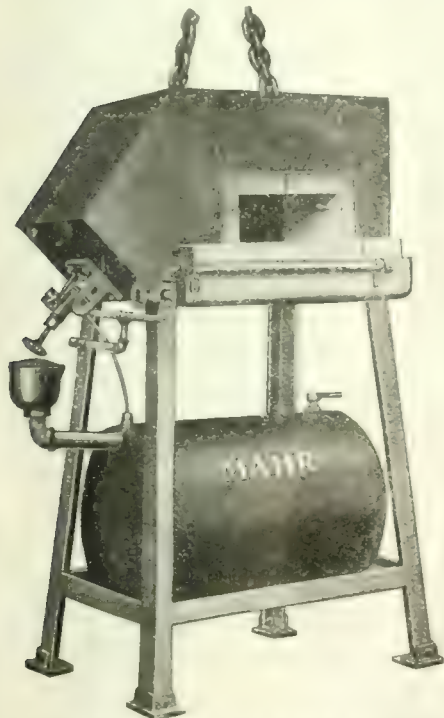
**T**HE oil-burning furnace, for forging and heat treating purposes, is rapidly becoming a very essential feature of present industrial enterprise. The necessity of scientific application of heat in the treatment of shell forgings, to conform to definite specifications relative to the manufacture of munitions, has demonstrated the advantages that could be derived from a better knowledge of this branch of engineering practice. The acceleration of efficiency in the construction of furnaces during

serious factor in the process of heat treatment of steel or other metals, and unless extreme care is exercised, the resultant effect of oxidization is frequently costly and inconvenient.

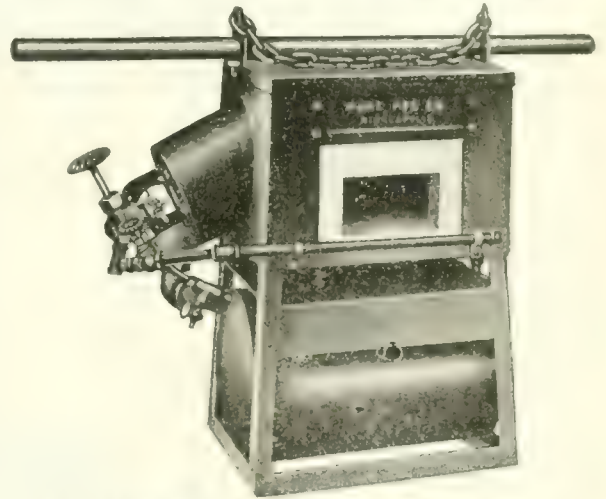
Realizing that a high efficiency furnace must be one in which the oxygen in the fuel mixture would be entirely consumed before coming in contact with the work in the furnace, the Mahr Manufacturing Co. of Minneapolis, Minn., have perfected a design of furnace in which the above requirements have been met. Apart from the method of carrying off the waste gases, the general design of the furnace proper differs little from those of other makes, but it is the design and construction of the burner and the combustion chamber that gives to the furnace its individuality and economic value.

It will be seen from the illustrations that the calorizer A is attached to the outside wall of the furnace in such a position that the opening D into the furnace is located near the roof of the heating chamber E. This permits of a swirling movement of the gases as they distribute to all sections of the heating chamber. Even after the gases have done their initial work, the surplus heat is still further utilized by a special arrangement of the outlet flues F, F, etc., as these circle the fire chamber, through the brickwork, before passing to the atmosphere—a decided improvement over

tion chamber through the oil nozzle G, and is atomized by the main air supply entering at H and passing into the combustion chamber around the oil nozzle. The atomized oil, having been lighted



GENERAL VIEW OF THE MAHR FURNACE



A TYPE OF FURNACE OF LOWER CONSTRUCTION

through the lighting hole I, receives a further supply of air through the lower air valve J. The effect of the due adjustment of these valves is to carry the flaming gas up to the point X, where it is met with an additional supply of air entering through the upper air valve K, this second current of air completing the combustion at the point approximately marked Y, at the same time giving the hot gases, so produced, the necessary velocity to carry them across, and circulate through the heat chamber. In the lower duct, between the oil nozzle G and the point X, the atomization

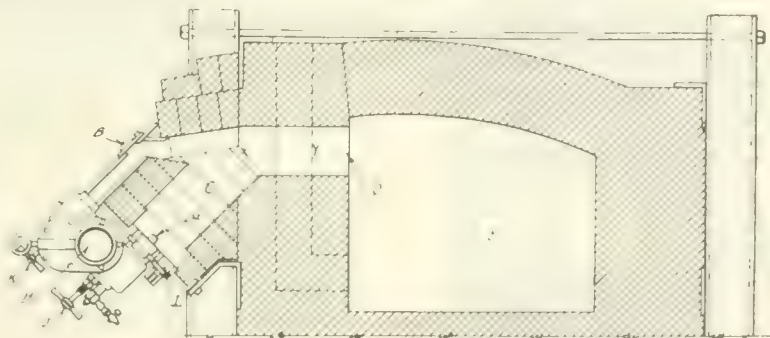
the war, was amply illustrated in the improved designs that were in successful operation at the close of active shell production. Experience, coupled with the study that has since been given to this all important unit, the oil-fired furnace, has enabled engineers to make further progress along these lines, and faulty design is gradually being eliminated and being replaced by improvements that will eventually establish the extreme economic value of this particular type of furnace.

In many styles of furnaces the actual heating chamber, in which the parts are subjected to the heat treatment, is likewise utilized as the combustion chamber, and the inevitable presence of oxygen necessary for combustion, invariably results in oxidizing the metal in the furnace. This has always been a

the old method, where the waste gases passed directly through the roof.

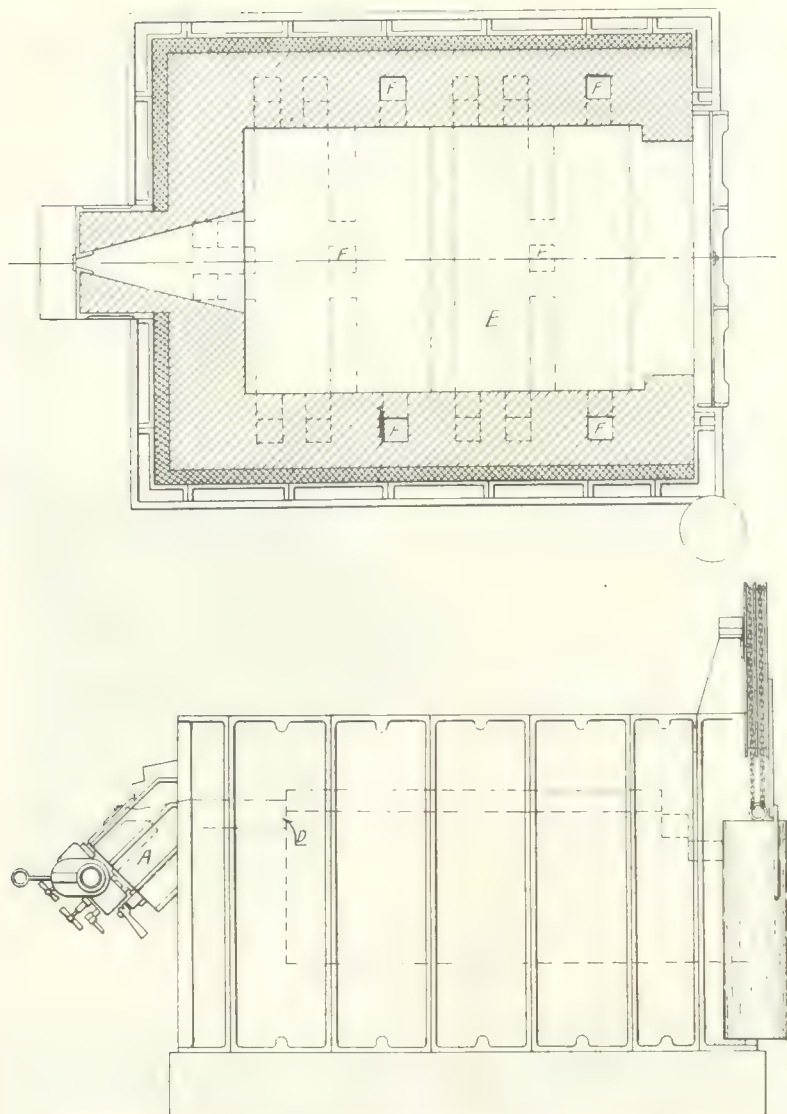
A brief description of the action of the calorizer may be given as follows: The oil enters the combus-

and the combustion should be carried well forward, but the supply of air should not be so great as to draw the flame entirely away from the lighting hole pocket. The peep hole is shown at



SECTIONAL VIEW THROUGH THE FURNACE

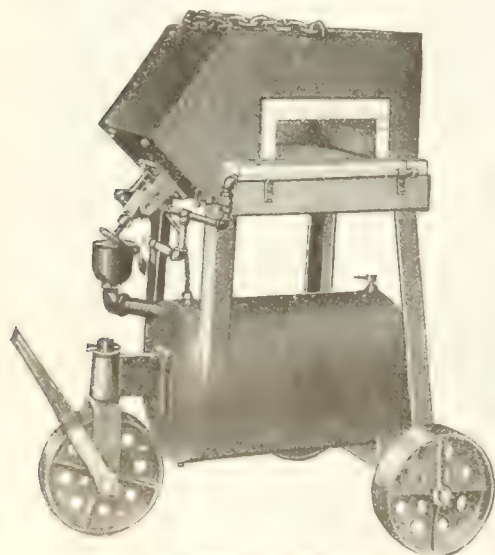




PLAN AND ELEVATION OF THE MAHR CALORIZOR AND FURNACE

B. If the above directions are closely adhered to it is claimed that but a short tongue of flame, at most, will find its way into the heating chamber, and the gases therein will be so free of oxygen that no oxidization of the metal will take

place. The even distribution of the heat is aided by the fan-shaped calorizer duct, where it enters the furnace. The action of the calorizer is similar to that of the carburetor on an automobile, where the latter is fitted with independent air valves. For satisfactory operation of these calorizers it is only necessary to have an air pressure of about 8 ounces, supplied by means of a blower. In general, the Mahr calorizers are uniform in size, but in the smaller furnaces and portable forges the calorizer is built into the furnace frame, while for the large furnaces the calorizer is a separate unit and can be located as desired. These furnaces are made in various types and sizes, including rivet, flue welding, forging, annealing and hardening types of every description. The James Buckley Company, of Montreal, are the exclusive Canadian agents.



A PORTABLE OUTFIT

#### AN IMPORTANT AFFILIATION

THE National Safety Council announces an affiliation with the University of Cincinnati for the purpose of carrying out a program that is unique—almost radical—both to the

fields of education and accident prevention, and that opens a new and promising avenue for the service of the council.

Briefly, this program includes the establishment of an industrial medicine division at the University of Cincinnati, where medical students and graduate physicians will be given special training not only in industrial medicine, but in industrial relations, including sanitation and all the fundamentals of safety work as well. This school, which is already under way, is unusual in many respects, chief among which are the following:

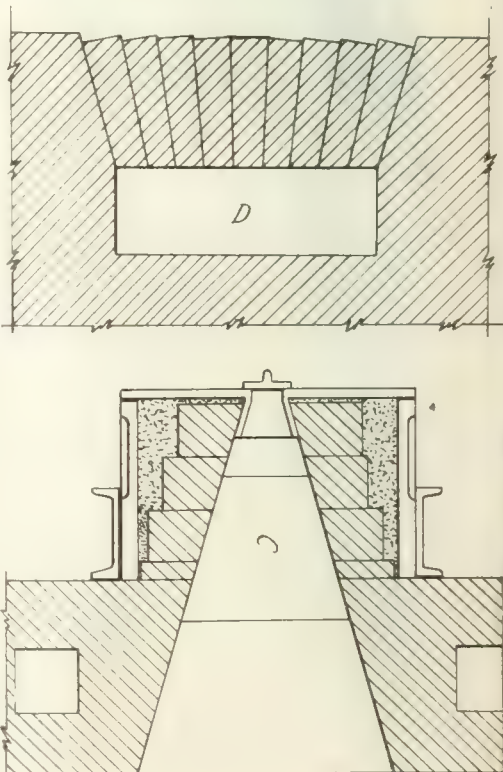
1. The student physicians alternately spend part of their time in school and part in the field among the industries of Cincinnati, Dayton and other Ohio cities, receiving actual experience in the work for which they are being prepared;

2. The enterprise was conceived by, and is being financed by the industrial leaders of Cincinnati and the vicinity, who have guaranteed a fund of about \$40,000 annually for five years;

3. In addition to the regular courses special courses will be given in such subjects as: (a) the medical, industrial and safety problems arising from the coming of women industry; (b) public health, and (c) hospital management;

4. The facilities of the school include an industrial research laboratory where physical conditions menacing the health of employees arising in industry will be brought up for investigation and solution. How can dust be eliminated in a certain plant? Is this gas injurious? How can the lighting problems of a peculiarly arranged factory be solved? These and all similar problems arising among the industries represented among

Continued on page 351



DETAILS OF REFRACTORY CONSTRUCTION.



# Nichrome Castings for Heat Treatment

The Subject of Proper Material For Heat Treating Receptacles is a Vital One and Herein Are Described Points of Merit in the Properties of Nichrome For Such Use

By HARRISON JENKINS

**I**N heat treating processes such as annealing, carbonizing, hardening and tempering, there is a demand for containers or receptacles made of metals or alloys which will maintain their strength and durability at high temperatures. Such receptacles undergo repeated cooling and heating from 1,500° F. to 1,850° F. and in order to avoid costly maintenance due to additional expense for labor, fuel, material and constant replacement, the heat treating containers must not be subject to cracking, changing in form, forming a surface scale or warping. Where the walls of annealing boxes, carbonizing boxes, etc., increase in thickness due to growing, or form a hard surface scale, relatively more time is required for the completion of the heat-treating process. In this case it takes longer for the heat to penetrate into the work. Where the physical strength of the material is comparatively small, it is necessary to increase the dimensions and weight of the receptacle to such an extent as to make handling difficult and to require considerable labor. The walls of heat treating containers are preferably to be made thin as possible in order to facilitate the greatest heat penetration.

## Strength of Materials at Low and High Temperatures

Although many metals and alloys have almost any required physical properties at ordinary temperatures, still all undergo a reduction in strength, change of form or scaling of the exposed surface at high temperatures.

There is a destructive reduction in the physical strength of cast iron, cast steel, structural steel, and wrought iron, and other ferrous materials when subjected to relatively high temperatures. Although in one set of experiments, structural steel at 400° F. showed an increase of 32 per cent. of its normal strength at 70° F. and similarly wrought iron at 570° F. had a 16 per cent. greater strength than its normal strength at 70° F., nevertheless both of these materials had a tensile strength at 1,500° F. less than 18 per cent. of their normal strength at 70° F. At 1,100° F. cast iron had lost 42 per cent. of its normal strength at 70° F. and copper and bronze showed reduction in strength at as low a temperature as 200° F. The figures given would be, in general, subject to varia-

tion because of differences in the composition of materials of this class. Nevertheless, they are examples of the destructive effects mentioned above.

When cast iron is repeatedly heated to 1,700° F. it undergoes a change in size, which is generally known as "growth," always accompanied by an increase in weight, equivalent to approximately 7 or 8 per cent., which is due to the absorption of gases in the formation of oxide.

At high temperatures the oxidation of the heated metal causes a scale to be formed on the surface of cast steel and wrought iron containers, which usually reduces the size of the pot upon repeated heating, as in the case of an-

since it has been used for some time in the manufacture of resistance coils and elements, for electrical heating apparatus and rheostats. The surface of nichrome boxes and containers does not oxidize at high temperatures, except in oxidizing atmospheres when a thin film of the oxide is formed, which is extremely strong and durable. This oxide film resists the action of alkalis and of such acids as sulphuric and hydrochloric. It is non-flaking and affords additional protection against corrosion or further oxidation.

Unlike iron or steel, nichrome is said to show no growth or appreciable change of form, as a result of alternate heating and cooling.

It will bend considerably before breaking, even when red or white hot. This quality may be demonstrated by heating to a red heat a plate of nichrome  $\frac{1}{4}$  in. thick, and then striking it with a 20 lb. sledge upon the unsupported centre of the plate. The result is a very gradual bending.

The tensile strength of cast nichrome at 1,500° F. is approximately 24,500 lb. per sq. in., or about 30 per cent. greater than the tensile strength of cast iron at 70° F. When cold, nichrome has a tensile strength of about 50,000 to 55,000 lb. per sq. in. It softens at about 2,500° F., and melts at approximately 2,750° F.

For heat treatment, cast nichrome is adapted for annealing and carbonizing boxes, heating retorts of various kinds, cyanide hardening pots, lead tempering pots, etc.

Some of the most useful applications of this alloy will be mentioned to illustrate the possibilities of cast nichrome as a substitute for other materials, in



FIG. 1—TUBES OF CAST NICHROME.

nealing and case-hardening processes where the original scale cracks off, thereby exposing a fresh surface, which again scales.

## Properties of Nichrome

The injurious effects referred to are claimed to be avoided in many cases by the use of a nickel chromium alloy known as "Nichrome." This alloy made by the Driver-Harris Company, Harrison, N.J., is composed of about 60 per cent. nickel, and the remainder principally chromium. It is melted in an electric furnace, and is cast in various shapes and in any weight up to 5,000 lbs. Nichrome is already well-known

two hundred and fifty hours' service at order to avoid cracking, growing, scaling, warping, change of form, corrosion or reduction of strength.

Nichrome castings are used extensively for annealing and carbonizing boxes. (See Fig. 1). They are much more durable than boxes made of cast steel. Whereas a steel box must be made quite thick in order to withstand reduction of thickness caused by scaling or oxidation, nichrome containers can be made thin and correspondingly light. Thus, efficient heat conduction is insured, at the same time maintaining sufficient strength. The durability of ferrous boxes is limited to approximately



1700° F., whereas cast nichrome boxes under the same conditions quite commonly give seventy-five hundred hours' service, and in some cases as many as eleven thousand hours' service has been obtained. While nichrome castings are

and holder used in immersing small heated iron or steel parts in a carbonizing cyanide bath at 1700° F. Similar baskets or utensils are used for pickling purposes and heat treating work. These nichrome baskets may be used for

throughout the country with a life at temperatures of 1600° F. to 1800° F. of from eighteen months to two years, as against twenty days to four weeks with ferrous materials.

Tubes of cast nichrome are used in many processes, as in the manufacture of hydrogen and rare gases from the atmosphere, or the treatment of wire in the manufacture of lamps, and also in the ball bearing industry.

#### Miscellaneous Applications of Cast Nichrome

The fact that cast nichrome withstands high temperatures, has enabled this material to be used for many important industrial purposes, besides containers for heat treating processes.

Cast nichrome is being substituted for other materials for many parts of special glassmaking machinery, for equipment for melting, pouring, conveying and rolling molten glass. The nichrome molds withstand a high temperature and produce more highly polished glassware. As in other applications, the molds are strong while hot, and therefore can be made much lighter than cast iron molds.

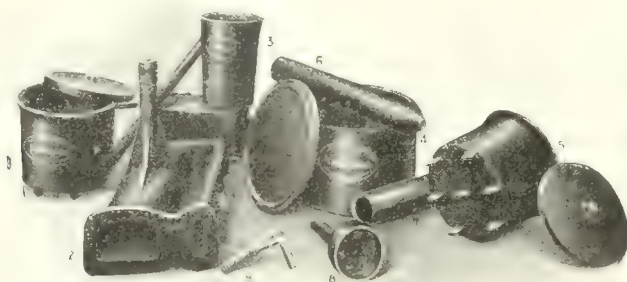


FIG. 2—ROTARY RETORTS.

more expensive than cast steel or cast iron containers, the difference in cost is more than offset by the superior qualities mentioned, and by the low operating cost per hour, which its use assures.

An important industrial application of cast nichrome is the dipping basket

a considerable period of time without being appreciably affected by the cyanide, nor do they shrink or lose weight. They are about one hundred times as durable as iron or steel wire baskets.

Rotary retorts (see Fig. 2) of cast nichrome for gas furnace applications are used in a great number of plants

## The Telautograph and Its Uses

An objection to the telephone is that it makes no record. For purposes where accuracy and a written record are required, the telautograph, which gives electrically, at any distance, an exact facsimile of writing or drawing done at the transmitting station, is being substituted in many commercial and industrial plants. How it now serves a valuable purpose in great steel mills is described by a contributor to the "Iron Age." These mills, we are told, have had to resort to messengers for carrying and distributing messages and analyses. The use of the telautograph does away with this unsatisfactory and dilatory service and reduces cost as well as increases the speed of distribution. We read in the magazine named above:

"Whatever the saving in dollars by eliminating the messengers' salaries, after all is far less than the indirect saving accomplished through the quicker delivery of analyses to the points where the progress of the work is dependent upon them. This is particularly and strikingly true at the open-hearth furnace. Before the telautographs were installed, in one plant, one hour elapsed between the time a sample was taken of the heat of steel from the open-hearth bath and the time the messenger came back from the laboratory with the analysis. All this time the steel was oxidizing and changing its constituency and the work of the plant was halted. With the use of telautographs this period of waiting has been reduced to about one-half hour, and therefore the melter at the open hearth is able to perform his duties more skilfully and more effectively.

Blast-Furnace Department

"In the blast-furnace department the

chief gain also is not in money saved through the employment of less labor but through increased efficiency obtained by getting laboratory reports quicker, and thereby enabling the mixers and furnaces to handle their work with precision.

"In the blooming-mill it is impossible to say just how many dollars and cents are saved by the telautograph through the elimination of mixing of heats which results in the shipment of wrong qualities of steel to the various customers. It is not possible to estimate how many mistakes would be made and how costly they would be if the telautographs were not used to keep things straight. Very often ingots have been rolled into billets, cut into required lengths, and loaded on flat cars for shipment when it was discovered that the steel had probably been mixed, making it necessary for a chemist to enter the car and drill a sample of every billet for analysis. Also frequently errors in mixing are not discovered until shipments have been received by a customer, and the plant officials were not aware of the fact until they received the complaint.

"The telautograph is not limited to the sending of words only, but it can transmit numerals, signs, symbols, sketches, or anything else that is written at the transmitting end and accurately reproduce them at the receiving stations. Furthermore, it can send messages to a single point or simultaneously to any number.

#### Specification Records

"Practically all orders for iron and steel contain specifications describing just the quantities of carbon, silicon, sulphur, phosphorus and manganese that

the materials to be delivered on the orders should contain. Each order is given a heat number to identify it throughout the plant, and copies of the order with specifications and heat numbers are sent to the laboratories, blast-furnaces, open-hearth and Bessemer mixers, soaking pits of the blooming-mill, chief recorder of the blooming-mill, hydraulic shears, billet and bar-mill, breaking-down mills and bloom yard office or other place where lies the control of final assignment to orders of heats or blows of steel."

The manufacture of all steel starts with the blast furnaces and the mixers. A sample of each heat from the blast furnace is sent to the laboratory for analysis and the results are written simultaneously to telautograph stations at the blowers and the mixers. This enables the blowers to know just what kind of iron they are making and whether they are approaching the specifications, while by obtaining this information in advance the mixer is able to prepare for handling the ladles when they arrive. This same plan runs through all the other operations in the mill. In addition the telautographs are employed at the billet-mill and at the shears to notify the chief recorder when any breakdown occurs and how long it will take to repair the damage. This enables him to plan a re-distribution of the work. To quote further:

"According to the geographical layout of the mills the need of various special telautograph services develops in different mills. In some they make good use of a telautograph line between the tube-mill and the tube-mill shipping-office for the shipping-office to report the names, numbers, and weights of freight cars they have loaded, together with the net weight of material in the cars.



## To Those Interested in the Drafting Course

SO great has been the demand for reprints on our Drafting Course that we felt this demand was worthy of special consideration.

"Are the reprints satisfactory in every way, or would it be good policy to republish this course from Part 1?" we asked various outside responsible parties, and in every case this suggestion met with immediate approval.

As one party remarked, "Why not run Parts 1 to 7 inclusive every week in place of every two weeks? Offer prizes as before. Let new students have an equal chance to earn prizes, but also allow old students to again participate. It will only take seven additional weeks to run these former parts, and you will have given all an equal chance in this very necessary study."

So, following this advice, we republish Part 1 in this issue, and suggest that students, old and new alike, send in their work for judging as early as possible. Part 2 will appear next week.

Three prizes will be given for each part as heretofore, and as the number of students is greatly increased the competition is bound to be keen and full of interest.

The sooner we receive the plates, the quicker we can announce the winners, so again let us say: "Let us have your work promptly."

We shall be pleased to receive the opinion of students in general regarding our policy of republishing the course in this way.



# Canadian Machinery Drafting Course, Part I

The Full Page Announcement on Page 345 Fully Explains Why We Republish This Portion of Our Course. We Hope the Interest Shown Will Continue, and Increase as Time Goes On

By J. H. MOORE, Associate Editor Canadian Machinery

**B**EFORE re-entering upon this series of talks or lessons on the art of mechanical drafting, the readers, both old and new, must realize that we could never, through the medium of a paper of this nature, conduct a rigid and very detailed course, for such would take years to complete, and ten chances to one become tiresome to the average reader.

What we do intend, however, is this, that for the reader who wishes to grasp the art of drawing as quickly as is practical and possible, we will prepare for him such lessons as we believe will help him along. The idea of re-issuing the seven parts which we formerly published is two-fold. First, to accede to the wishes of the many new students, and to be fair, we want to give them an equal chance from the beginning, while secondly, it will, after all, do no harm to those already enrolled to go over the ground once more, and perhaps win a prize where they did not before.

It is only a matter of seven weeks' difference, for in these reissues we will publish a portion every week in place of every second week.

We are especially desirous of having the students send in their work. We, in this way, see how they are progressing and know that a keen interest is being taken in the course. We expect about 250 students to be taking part in these lessons, so keen competition is sure to be the rule. Old students and new alike are eligible for these prizes, so let us see your work as early as possible.

ing and its application to the working drawing.

We will work up gradually from the straight line problem into the actual assembly drawing, but will go to such a stage by easy steps. We want the apprentice to feel that here is a course specially arranged for him, and should he get puzzled at any time that we will be only too willing to answer him, and lift him over the difficulty. Close study of this course should increase the earning power of the student, and besides, the objective of each student should be to land at least one prize. So now that we have introduced the object and aim of this series, let us proceed at the very beginning and see what mechanical drawing really is.

## Mechanical Drawing

To put it as briefly as possible, mechanical drawing is the method of showing graphically the intricate details of machinery. It is, so to speak, the language by which the draftsman speaks to the workman. A brief study of a well-executed drawing gives a much better idea of the machine portrayed than a long-winded verbal, or even a detailed written, description would ever do. In fact the better and clearer the drawing is made the easier the workman can comprehend the ideas of the draftsman.

A neat drawing for instance was never made by a careless worker, nor even by a good draftsman with poor instruments, but as you seldom see a

In fact, if one can afford it, the best plan is to purchase the better grade right at the start, but this is simply a matter which rests with the student himself.

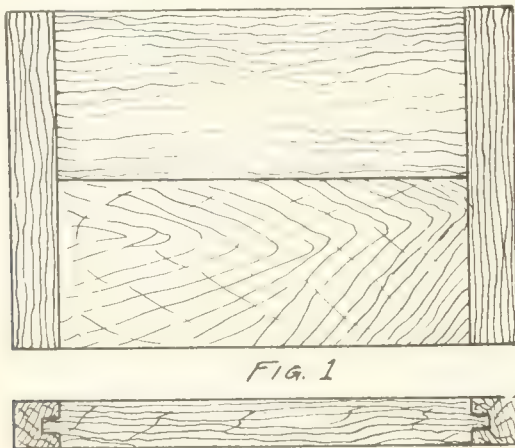
## Instruments and Materials

First comes the question of paper. In selecting drawing paper, the first thing to be considered is the kind of paper most suitable for the proposed work. As we are principally interested in the needs of this course, we will consider only the paper most suitable for our purpose, for practically every drawing office throughout the country have their own particular pet paper, which they claim is the best ever.

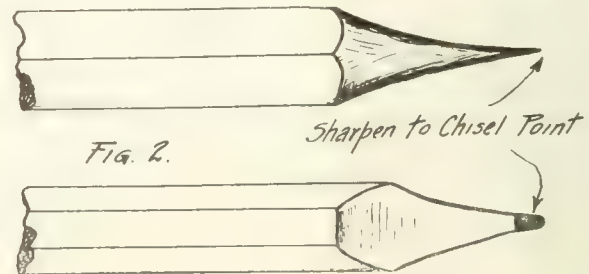
To keep the expense item down to the lowest possible figure, we will call for sheets  $9\frac{1}{2} \times 13\frac{1}{2}$  in. in size. This allows students to purchase their paper in what is called the demy size of sheet, this being a sheet 15 in. x 20 in. By careful cutting you have two sheets from each large one, 10 in. x 15 in., sufficient size to cover the work. Whatman's paper is considered by many the best grade of paper, and either the cold pressed, or hot pressed, will answer the purpose. The hot pressed paper has a smoother surface, but does not stand erasures as well as the cold pressed sheets, so it might be well for readers to get the tougher material, for no doubt there will be considerable erasure made at the beginning.

## Drawing Board

The drawing board, Fig. 1, is usually made of well-seasoned, and straight grained soft pine. Each end is protected by a side strip, usually about 2 in. wide. This strip is trued accurately to suit the T-square, but as students will more than likely purchase their drawing



SKETCH OF DRAWING BOARD.



SHARPENING THE PENCIL.

Regarding the course, we will try to only touch on the most essential points as we go along, keeping in mind that this is a course specially arranged to meet the requirements of the machinist apprentice, in order to illustrate to him the basic principles of mechanical draw-

good designer with poor instruments one can usually tell the character of the draftsman by his style of drawing.

To the beginner, however, a cheap grade of instruments would suffice, but as he becomes more expert he would do well to secure a better grade of tools.

boards, we will leave this matter for the reader to study at his leisure.

Thumb tacks are used to fasten the paper to the board. There are all kinds on the market, but a grade about 10c to 20c a dozen will suit the student's purpose admirably.



In regard to the pencils required. Lead pencils are graded according to their hardness, the degree of which is indicated by the letter H. For example, H means simply one degree of hardness; 6H, six degrees, and so on. A pencil of 4H grade is ideal for general working conditions. Some authorities claim 2H or 3H are better suited for lettering purposes, while for intricate detail work a 6H pencil will be found best suited to this class of work.

The hard pencils should be sharpened as shown at Fig. 2, so that in penciling a drawing the lines may be made very fine and light. The wood is cut



Fig. 3

SKETCH OF T-SQUARE

away so that about  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in. of lead projects. Lead can now be sharpened to a chisel edge as shown on the sketch. In the drawing of the lines the student should place the chisel edge against his T-square, or triangle, enabling him to draw a clean-cut fine line, through points as desired. Should no inking be necessary, a softer grade of pencil is used than if it is intended to ink in over the pencil work.

### T-Square

The T-square gets its name from its general appearance, and consists of a thin straight edge called the blade, with a short piece called the head, and fastened at right angles to it, see Fig. 3. T-squares are usually made entirely of wood, pear and maple, in the cheaper

much expense on this end, except they really wish to. for a T-square of good quality can be secured for very little cost. Some T-squares are also provided with swivel heads, but for the purpose of this series we will not discuss this point, as it is not a necessity.

To show clearly the use of the T-square, refer to Fig. 4. Always keep the head A up against the left-hand edge of the board, otherwise the various lines drawn will not be parallel. Lines

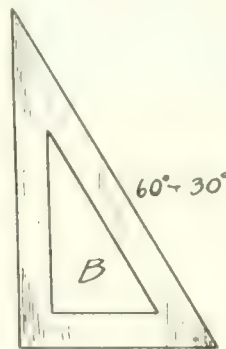
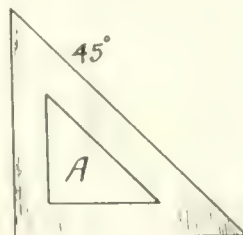


Fig. 5

SKETCH OF TRIANGLE

A, B, C, D, and E, are drawn  $\frac{1}{4}$  in. apart and 6 in. in length.

Take a piece of paper and practise this exercise. You will be surprised how the pencil will want to go still further, until you learn to control your hand properly. Mark your  $\frac{1}{4}$  in. distances with your ruler, and draw your vertical lines 6 in. apart with a triangle, which we will now describe, both as to its uses and material.

Usually triangles are made in two styles, 45 degrees and 60—30 degrees as shown at Fig. 5. A represents the 45 deg. triangle, while B illustrates the 60 deg.—30 deg. These instruments are made of wood, steel, celluloid, or rubber, depending on the price. The student's pocket-book capacity can be his guide as to the kind he purchases.

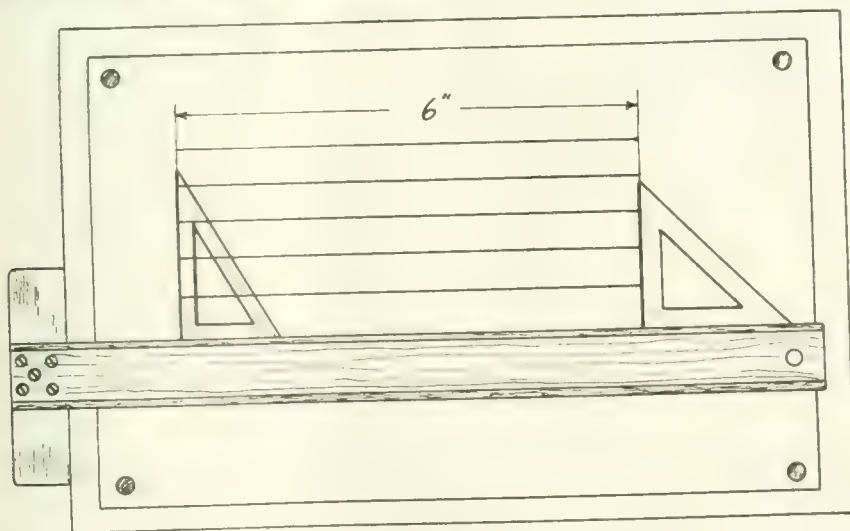


Fig. 4

PRACTISE LESSON ON HAND CONTROL.

grades; mahogany, with protection edges of ebony, in the middle class, while celluloid edges are placed on the more expensive ones. Readers need not go to

A 6 in. or 8 in., a side size, will be found convenient for most work, and will be ideal for this course. By purchasing a triangle of each style as already des-

cribed, the student is well equipped for such work as the course will present at the start.

Taking it for granted that the student has now a drawing board, T-square, pencils, rubber, and triangles, we can go ahead with the exercise at Fig. 4.

First practise making the lines A and

B 6 inches apart. Draw these vertically by means of the T-square and triangle, either one, as shown. Next use the T-square only, and draw your horizontal lines, meeting the vertical lines, yet not going over them. This is most important, for the exercise is simply one to teach control of the hand. All lines must touch, but not go over, yet be sure of the point, that they much touch. Draw these horizontal lines  $\frac{1}{4}$  in. apart, marking off the spaces with your ruler, or scale, as it is usually called.

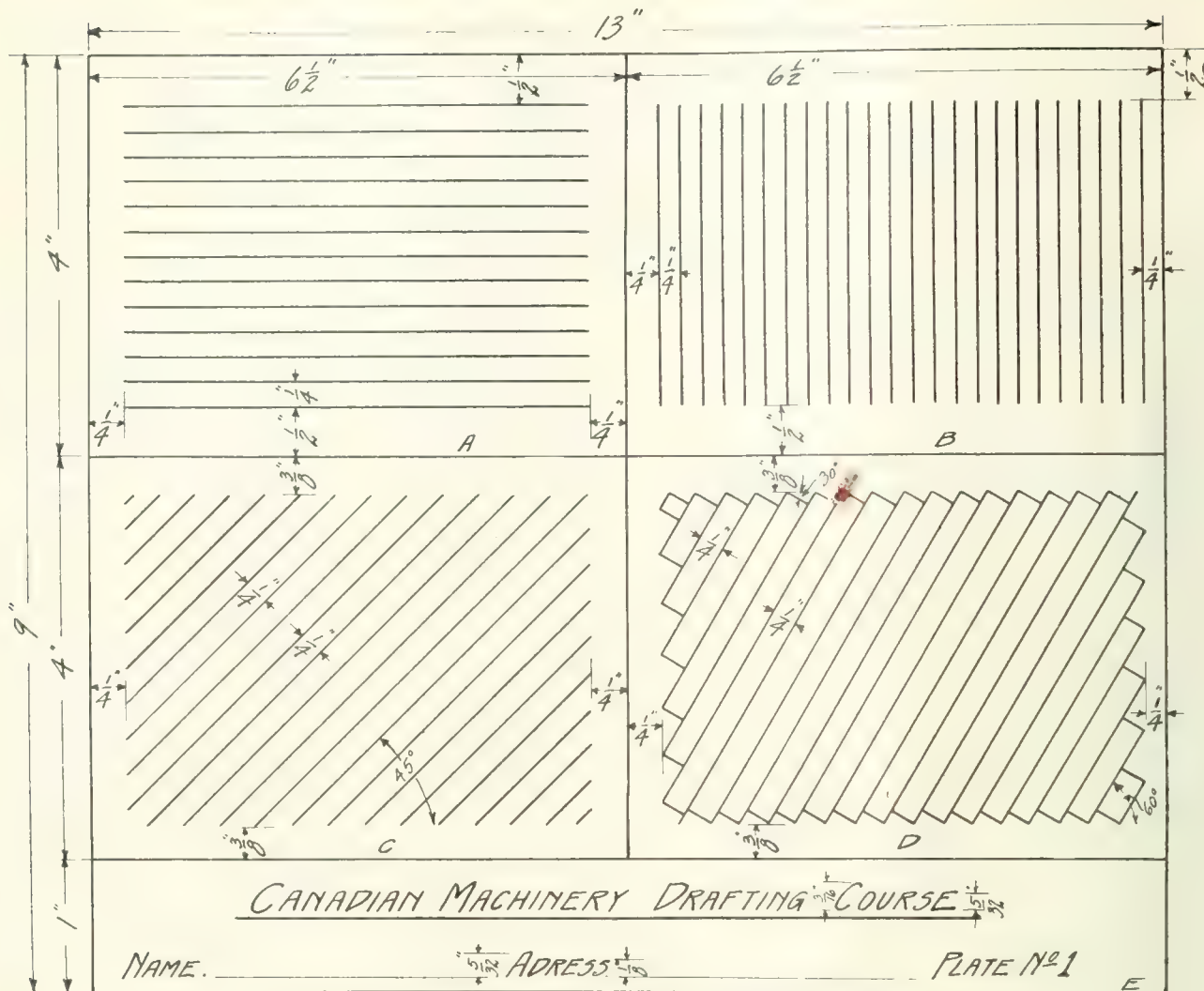
After you believe yourself proficient enough, study Plate No. 1. To the best of your ability follow the instructions closely, draw up the plate, and send us in your work.

To the three neatest plates received, we will award a prize in the shape of a special 6 in. steel scale, with drill sizes, decimal equivalents, etc., stamped on its face, and in all future issues on this series, will carry out the same plan, forwarding a scale to the three best and neatest plates received on each part or plate.

### Instructions

First tack a piece of paper 10 in. x 15 in. on the drawing board, using T-square to see that it is placed on fairly square. Now draw the trimming lines  $9\frac{1}{2}$  x  $13\frac{1}{2}$  in. Next draw border lines as shown at Plate No. 1, 9 in. x 13 in., and join. Divide the sheet up into 5 sections A, B, C, D, and E. In portion E print in the lettering as shown, and while we do not expect this lettering will be of splendid standard, still it will help you to get ready for the separate lesson to come later in the course. In section A, complete the horizontal lines, each  $\frac{1}{4}$  in. apart as illustrated, stopping  $\frac{1}{4}$  inch away from the border, and dividing lines. In section B, draw up the vertical lines, following out the dimensions given. At section C, draw 45 degree lines as shown, using your T-square and sloping edge of 45 deg. triangle. At section D draw up the 60





WE HOPE TO SEE STUDENTS SEND THIS PLATE IN PROMPTLY.

deg. and 30 deg. lines as illustrated, using your 60 deg.—30 deg. triangle, together with your T-square. In all cases study the plate carefully, and work to the dimensions shown.

Remember that neatness counts. For the drawing of this plate use a 3 or 4H pencil, and make your lines decided, and plain. Send us in your work as soon as you can. We will judge each plate two weeks after its issue, giving you lots of time to send your work along steadily, so get busy with a capital B, and watch for Part 2, which will further explain the various instruments, and their uses. When sending in your plate, use the coupon, and fill the same

in carefully. At the same time if you feel so inclined, write us your ideas on this course, and if it appeals to you. We are mighty anxious to make this course of great benefit, so let us hear from you when your work comes in.

In studying the plate, do not pay any attention to the scale shown on the sketch. Work to the dimensions given, and the result will be what we want. We purposely do not give you an exact copy to work from, but rather let you prove that you have followed instructions closely. It is not necessary to ink in this first plate, so as stated before use a 3 or 4H pencil, and make your lines plain and decided.

Mail your plate flat, do not fold, or if desired you can roll it up and place it in a regular mailing tube. Be sure you have sufficient postage placed on the same. We will not return plates unless specially requested to. In such cases return postage must always accompany the request. Address all correspondence on this course to CANADIAN MACHINERY Drafting Course, McLean Publishing Co., 143 University Avenue, Toronto, Canada.

The Germans have not the glory of being the original gas-attackers; for a certain kind of beetle has been gassing its enemies for centuries. When it sees a gargoyle-like creature, it promptly ejects an explosive fluid from the last ring on its abdomen.

This fluid smells very much like nitric acid, and consequently is of great help to the beetle in its battle for existence.

The War Department's 15,000,000 excess hand grenades are to be remodeled as penny and dime-savings banks, and will be distributed to schoolboys and girls who can show one or more War Savings Stamps earned during the coming summer.

#### Tear off and send with drawing

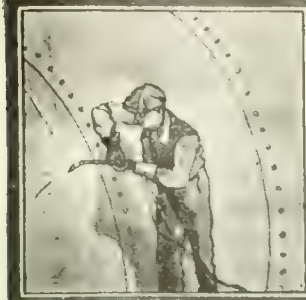
Name .....

Address .....

Position .....

Firm's name.....





# WELDING AND CUTTING



## Milling Machine versus Oxy-Acetylene Machine

An Interesting Description of the Work Done by a Straight Line Cutting Blowpipe in Cutting Slots in a Slip Socket—The Dimensions of Same Deserve Attention

**T**HE cutting of slots or openings in steel or wrought iron is a machine shop operation that requires a great deal of time when performed by milling machines, drill presses, broaching machines, or any of the other machine tools. The cheapest known method of performing the operation is by means of the oxy-acetylene cutting blowpipe. Such cutting can be done free hand with surprisingly good results, but where an absolutely true cut is desired, it is advisable to use an Oxyweld straight line cutting machine, Fig. 1. The cut made with the aid of this machine is as true as a cut made by any other method, and almost as clean, in fact for most purposes it is sufficiently clean without any further finishing operation. Even in the few cases where finishing is necessary in order to obtain an absolutely square edge, the time gained by roughing out with the blowpipe constitutes a big saving.

A very interesting example of this sort is furnished by Fig. 2. This picture was taken at the plant of the Acme Finishing Tool Company, Parkersburg, West Virginia, and shows slots cut out with an Oxyweld cutting blowpipe, which were formerly cut at a much greater cost by means of a milling machine. This operation as applied to slip sockets, which are tools used for the purpose of "fishing" churn drill tools out of oil or gas wells after they have broken loose from the drilling rope.

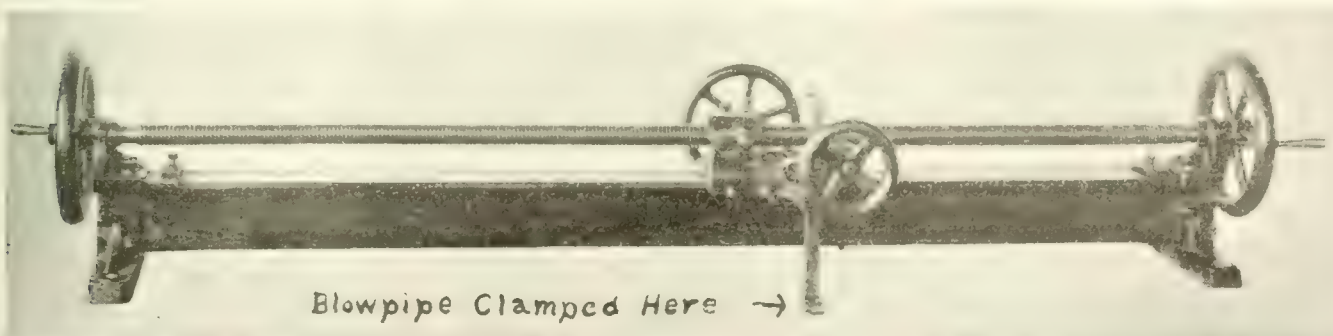
The steel slip socket illustrated in Fig. 2 weighed 1,600 pounds. The pieces

cut out by the oxy-acetylene blowpipe were 3 inches in thickness, 26

long, 4 inches wide up to 6 inches width at wide end. The cutting was done with



FIG. 2 SHOWING SLOTS CUT IN SLIP SOCKET. THIS PIECE WEIGHS 1600 POUNDS.



Blowpipe Clamped Here →

FIG. 1 A GENERAL VIEW OF THE OXYWELD STRAIGHT LINE CUTTING MACHINE.



the aid of the Oxyweld straight line cutting machine, which held and guided the blowpipe, feeding it at a uniform rate of speed. By the aid of the straight line cutting machine the cutting was done so smoothly that no finishing was necessary. A cut of this sort is very easy to make, the rounded ends being the only parts causing any difficulty whatsoever.

## Acetylene in Chemical Warfare

By MAJOR-GENERAL W. L. SIBERT, U.S.A.

Address delivered before the 1919 Convention of the International Acetylene Association.

WHEN I was in the Philippines and was confronted with the necessity of learning the Tagalog names of the cities and towns on the maps of that region, I felt that I could never accomplish it. Later, in China, when I had to have on my tongue's end such names as "Hwangho," "Yangtze Kiang," "Chinkiang Pu," etc., I felt as if I were in a more hopeless condition than when in the Philippines. But when I first gathered together the representatives of the 1,000 research men of the Chemical Warfare Service, and they commenced to talk about diphenylchlorarsine, diphenylamine arsine, brom benzyl cyanide, chlorpicrin, etc., I felt more helpless than I did in the Philippines or in China, and told them that while all those things might kill Germans and win the war, they had to limit the substances to the number of names that I could remember.

I can understand why the doctor who depends often upon the psychological effect of things still adheres to Latin names, but the chemist ought to simplify his nomenclature if he expects the support of the everyday man.

I do not know anything about acetylene, except the uses to which the engineer puts it in cutting up and welding steel with the oxy-acetylene flame, and by the use of an acetylene light converting night into day.

I remember in Panama when the work indicated the necessity of transferring a dredge from the Atlantic side of the Isthmus to the Pacific side, and it was not practicable to tow it around the Horn, a plan was adopted of dismantling the dredge, cutting the hull on cross section into pieces that could be handled by a wrecking crane, loading them on cars, shipping them across the Isthmus, reassembling them on ways, and riveting a steel batten over the cracks; all of which was possible on account of acetylene.

My mind within the last year has been drawn to the necessity of chemical development in every direction in this country. When one looks back he must appreciate the absolutely helpless condition the United States would have been in prior to 1917 had it been called upon to prosecute a war with a great nation, and had it been unable to control the seas. Its effort to resist a foe would have been on a par with that of China. It would not have had powder enough to last two weeks, and would have had no

Each of the two cuts was completed in eight minutes. Formerly it required one machinist eight hours to make both cuts on a milling machine; in other words the new method requires one-thirtieth as much time, and it is estimated that the net saving per socket by the use of the oxy-acetylene process amounts to \$25.

nitrate out of which to make more. The absence of a dyestuff industry with its by-product coke-ovens, would have limited the supply of raw materials for the manufacture of explosives and gases. Future will be more and more chemical wars, more and more scientific, and the nation that has developed its chemical possibilities will enjoy a great advantage.

One of the big questions presented for solution to-day in this country is chemical preparedness for war, through the development of chemical industry that has peace application.

There is nothing to indicate that Germany, prior to the war, had made any systematic arrangement to utilize her dye factories for war purposes, because many of her chemists were in the beginning called into military service. This and many subsequent developments of chemical plants for war needs causes one to think that Germany confidently expected the war to end in a very few months, that she had sufficient materials in storage, and that her mind was not turned to the full utilization of the chemical resources of the nation for the support of the army, until after the results at the Marne.

There is one notable exception to this, and that is the development of the processes for the production of ammonia from atmospheric nitrogen. It was not until the end of 1912 that there was any large scale production of ammonia by this method. In other words, the great war was not brought on until the way was clear—that is, it was not brought on until Germany could produce within her own boundaries a supply of ammonia and nitric needed in the manufacture not only of her propellants, but also for the fertilization of the land, so as to make the feeling of the army certain.

When it became apparent, after the battle of the Marne, that the available supply of material for the manufacture of suitable propellants and explosives would soon be exhausted, it was then that the great chemical establishments of Germany were called upon to convert their plants, that had been utilized in making dyestuffs, into high explosive plants and gas plants; it was then that the chemists that had been drafted into the army were returned and utilized with existing plants and with necessary extensions—all in order that the needs of the army might be met. The existence of this great potential reserve made Germany a powerful adversary.

It is a peculiar fact that if you probe nearly any line of chemical industry you will find that it has a war application as well as a peace application. You gentlemen are engaged in the carbide and acetylene industry, and while I am not a chemist, I would take a few minutes of your time to mention some of the ways that our people think the manufacturing plants for acetylene may be a preparation for war. Of course, the ordinary uses of it, the process of welding and cutting steel, and its use for signal flares and illuminating processes, need not be repeated. The use of burning acetylene to light the fields of England in order that all the land possible might be planted, is merely an extension of a well-established use.

The great development of airplanes in this war called for a large supply of acetone for the preparation of airplane dope. The synthesis of this chemical commodity as well as acetic acid, beginning with acetylene as a starting point, is now a commercial reality. The Government expended over \$100,000,000.00 in its nitrate plants, which nitrates were to be used in making propellants and fertilizers, both in times of peace and in times of war. The largest of these nitrate plants utilized the cyanide process of fixing nitrogen, and this audience need not be told that cyanamide in turn is prepared from calcium carbide.

Mustard gas is prepared from ethylene, which is usually prepared from alcohol. Have we not in acetylene a raw material from which ethylene can be prepared on a successful commercial basis? Further research and development may establish such a fact. In fact, our research people tell me that the entire subject of the chlorination of acetylene, and the preparation of its chlorine derivatives, is one that should be carefully investigated, not only from the standpoint of chemical industry in times of peace, but also from the standpoint of the preparation of raw materials for war needs.

The interaction of acetylene with phosgene, with arsenic trichloride, with stannic chloride, and with antimony trichloride, are all fertile fields for investigation. It is apparent, therefore, that we have in the acetylene industry, an association with war problems which may be as important as the association of the coal-tar chemical industries with such problems.

What the Government needs is chemical industry in every line that nature has made it commercially practicable to develop. We want to be in the same position that Germany was in during this last war, so that whenever research indicates that some new substance or some substance hitherto not manufactured, has a military value, the heads of the chemical interests of the country could be called together and given the problem with the full expectation that they could solve it and would solve it, that some existing chemical plant could be changed into one suited for making this substance, that the various well-



tried research establishments could soon overcome any difficulty in its manufacture, and that there would always be a personnel available for such manufacture; because this war has shown more strongly than it has shown anything else, that a country without an extensive organic chemical industry will be seriously handicapped in war against the nation that has such industry.

Of course there is no need for me to tell this audience these things. If they stop to think they will know them. But it is always well to impress upon people that there is a public use that might be made of their appliances when their country is in need, because the average man takes pride in assisting his Government when it is in need.

This country needs now to develop a certain and sure nitrate supply; it needs to develop large dyestuff industries; it needs to have its acetylene industries developed and protected, if need be against hurtful foreign competition.

Chemical warfare, as such, made its first appearance in this war. It probably caused more casualties than any other single implement in the war. It has in it more possibilities than any adopted implement of war. If the Chemical Warfare Service of the Army keeps closely in touch with all of the chemical industries of the land, if such industries are sympathetic with the needs and aspirations of the Government, and each of them exchanges research information of value to the other, and if the Congress of the United States insures the development of such chemical industries, we can trust to the ingenuity of our chemists and chemical engineers to see that his country enters no future war except upon equal terms with any adversary, in so far as chemical warfare is concerned.

Had the Germans known at Ypres the effect of the first chlorine cloud that they passed over the allied lines, and had they had confidence in their own protective devices and followed closely such chlorine cloud, they could have penetrated to the channel ports—all of which shows what the surprise use of a chemical substance means.

Although the gases used in the great spring drive by the Germans in March and April, 1918, were known gases, the new tactical use of gases made possible through Germany's ability to make them in great quantities almost caused a German victory. By saturating the strong points of the line with mustard gas for 48 hours before an attack, back to a depth of five or six miles, and by saturating the road crossings through which reserves and ammunition must pass, one of the English armies in the first onset in March was largely paralyzed—its strong points were made ineffective, and the weak points easily taken.

The inspection of the German gas plants in the Rhine district indicates that this country has nothing to fear in the chemical world provided competition is fair and protection is the same. I wish the statesmen of this country could visit Edgewood Arsenal, and see what our people can do when put to the test.

## AN IMPORTANT AFFILIATION

(Continued from page 342)

the students and sponsors of the department of Industrial Medicine will be tackled at the industrial research laboratory.

This plan being carried out jointly by the College of Medicine of the University of Cincinnati and the Cincinnati Local Council of the National Safety Council which represents the first attempt in America to train doctors for industrial work, in the opinion of C. W. Price, general manager of the National Safety Council, promises much for other cities.

"The Cincinnati plan grew out of a very definite need," Mr. Price said. "During recent years there has been a great call for industrial physicians but there was no institution that gave special instruction in industrial medicine. The new department of industrial Medicine and Public Health of the University of Cincinnati special courses for the training of industrial physicians and surgeons are now being offered. In connection with the regular medical courses the student will be given instruction in industrial medicine, shop sanitation, occupational hazards and diseases, labor economics, labor conditions and problems, industrial relations, accident prevention and employment. "The product of this special training will be not merely an industrial physician, but an executive who in the larger plants can take charge of an Industrial Relations department that would include, the safety engineer, the plant physician, the employment manager and others. The men who receive the special training offered at Cincinnati also will fill a long-felt want among the smaller industrial plants where conditions do not justify the hiring of a safety engineer, a physician, and an employment manager. In such a plant all three of these positions could be filled by one man with the training now available at Cincinnati."

Dr. Carey P. McCord, who did notable work in organizing and conducting military hospitals during the war has been appointed director of the Department of Industrial Medicine and Public Health of the University of Cincinnati. The National Safety Council will be represented at the school by C. H. McLain, formerly safety engineer and assistant to the supervisor of labor at the Dayton Electrical Company, Dayton, O., who has been appointed secretary of the Cincinnati Local Council of the National Safety Council.

The Cincinnati plan provides for the co-operation of the National Safety Council, not only with the University of Cincinnati, but with the general educational system of that city. The secretary of the council will give twelve lectures on school and public safety in the teachers' college of Cincinnati, so that the teacher in making will be prepared to pass on such instruction to young America. Later, a similar series of lectures will be given to a class made up of one of more teachers from each public school in Cincinnati so that she in turn may acquaint fellow-teachers with

the fundamentals of education in accident prevention.

Finally, a course of safety lectures similar to that given at the National Safety Council's schools for safety supervisors at St. Louis, Cleveland, Pittsburgh and Rochester will be given to every class in the Engineering School of the University of Cincinnati.

An entire general session and two sectional meetings of the Eighth Annual Safety Congress of the National Safety Council, which is to be held at Cleveland, O., October 1st to 4th, inclusive, will be devoted to discussion of health service in connection with organized accident prevention work.

The program of the congress, just issued, lists 160 speakers, including some of the men most prominent in the practice of industrial medicine. It is expected that more than 3,000 safety engineers, industrial physicians, plant managers and others interested or actively engaged in the work of accident prevention will attend the congress.

Dr. Charles A. Lauffer, medical director of the Westinghouse Electric & Manufacturing Company, will preside at the general health session on the afternoon of October 3 in the ballroom of the Hotel Statler at Cleveland, and at the health section meetings during the mornings of October 3rd and 4th.

While not generally known it is a fact that during the nineteen months of our participation in the war with Germany, the casualties from accidents in peaceful America were more than twice as great as the casualties among the American troops in France. The statistics of the United States census show that more than 70,000 persons died each year as the result of accidents in America. It is estimated that 20,000 of these deaths are caused by industrial accidents and 50,000 by accidents in the streets and homes.

It has been the experience of men and women engaged in organized accident prevention work that a large number of the deaths attributed to accidents result only indirectly from accidents and more directly from causes than can be eliminated by health education. The National Safety Council and the 3,300 industrial concerns included in its membership are, therefore, giving more and more attention to health education and health service in the war on accidents.

An Imperial Mineral Resources Bureau has been established in London, charged with the duties of collecting information regarding the mineral resources and metal requirements of the British Empire and of giving advice to the Government authorities in reference to the same. The Bureau is to be directed by a board of governors, comprising one appointed by the Home Government, who will serve as chairman, one by each of the five self-governing dominions, one each by the Government of India and the secretary of state for the colonies, and six representatives of the mineral, mining and metal industries.





## WHAT OUR READERS THINK AND DO



# Another Outburst on the Parting Tool Question

We Invite Readers to Send Us Their Practical Experiences.  
There is No Reason Why This Page Should Not Go Strong, so  
Send Us Your Ideas, and When Published You Will Be Paid  
For the Same

### CURLING OF THE CHIP

J. H. RODGERS

In the setting of parting tools one of the most important factors to consider is the relative position of the cutting edge to the direction of the feed.

Some operators advocate a slight rounding of the nose, so that the edges of the chip will tend to curl to the centre as the tool advances to the work.

This method frequently assists the easy cutting of the metal, but the essential point to keep in mind is that the neutral line of the cutting edge—be it slightly rounded, or perfectly flat—should be at right angles to the direction of the feed; in other words, parallel with the axis of the lathe. The sketch will show the advantages of the above suggestion.

If the cutting edge is at an angle with the centre line, be it ever so slight, the chip will curl at right angles, forcing the cut metal against the edge A.

As the particles break off, they work down between the side of the tool and the slot, and force the tool to spring in the direction of the arrow, thus causing the side of the tool to bite into the side of the groove.

If the tool is not strong enough to stand this additional stress, breakage will follow.

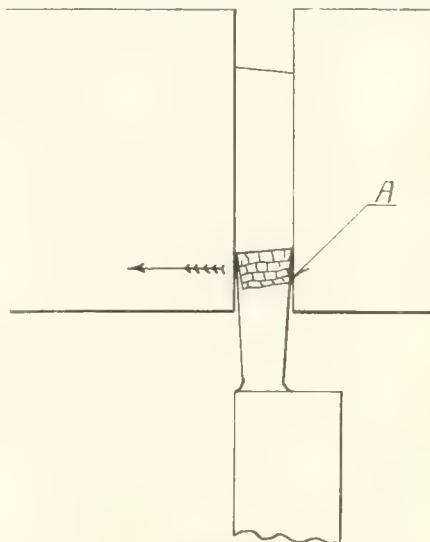
Clearance, rake, and set of the parting tool are essential to good results, but this feature of the curling of the chip must not be overlooked, otherwise the work performed will not be satisfactory.

### ANOTHER VIEWPOINT

In your issue of July 17, on the subject of parting tools, I am one reader who does not coincide with the views of the author. First of all I could not say that "The most peculiar thing is the lathe nearly always gets blamed in connection with parting off stock." As I have seen troubles in that connection in shops where the parting is done entirely with saws (which is the best method where there is any depth of cut and wherever practicable).

As I presume the discussion is on what is commonly known as the parting tool, however, I will not say any more about the saws. As to the ordinary forged tool being the best, I would modify Mr. Ernest's statement and put it in this way: That it is the best for lathe shaper or planer where there is any depth of cut to be taken.

I agree that there must be clearance from the cutting edge in every direction, front, top and sides. The corners should have all the support that it is possible



THIS IS MY THEORY.

to give, and still have clearance about one degree on each side away from the corners, front clearance about five degrees for the lathe tools and three degrees for shaper and planer tools. There should be a lip ground on the top about  $\frac{3}{8}$  of an inch radius, deep enough to make the top slope from cutting edge about twelve degrees. Care must be taken in the setting of the parting tool to get the support as directly under or behind the cutting edge as possible, as the more overhang, the more apt it is to break.

The flat steel with the Armstrong holder is a very handy tool to have

around the lathe or shaper where the parting cut is not very deep, but it does not take the place of the forged tool entirely. I would not recommend the method of peening the edge with a hammer as I prefer to find the blades too hard to do that; like the forged tool, you will find that grinding a slight lip it gives better results, and as the stock used in the Armstrong holder has about one degree clearance on each side by having a lip it leaves the cutting edge a little wider than the bottom of the lip, when you take this tool to the blacksmith and have it upset that defeats its purpose I would avoid this and keep the tool for the work it is best adapted for.

I have found that the ideal position of setting a parting tool is (whether it be single or double) the one commonly used in special cutting-off machines, where the tool holder is shaped on the side nearest the chuck to take flat stock, held firmly by a clamp on top, the tool is set on a slope of 13 degrees, this position giving the cutting edge the best support; being ground straight on top gives the same effect as a lip on a tool that is set horizontal. The front is ground at an angle of 18 degrees. This type of tool can stand more side clearance than the ordinary forged tool. For heavy work, such as cutting off billets for shells  $\frac{1}{4}$  in. by 2 in., flat stock was used; this can be upset to  $\frac{3}{8}$  in. wide at the point and be used until it is less than 5-16 of an inch, keeping the same clearance away from the cutting edge always.

It will be found that when this type of tool is used single, it should be set with point a little above centre so that any spring or slackness there might be is taken up and it is working at centre.

A simple method for upsetting these tools is to cut a piece out about half the width of the tool and  $\frac{1}{2}$  inch from the end, leaving a shoulder to rest on the anvil, flattening out the point, then turned over with top of tool on anvil, then hammered on sides and end, reheat and cut off the corner.

It is now ground to shape and hardened. In conclusion I would say that

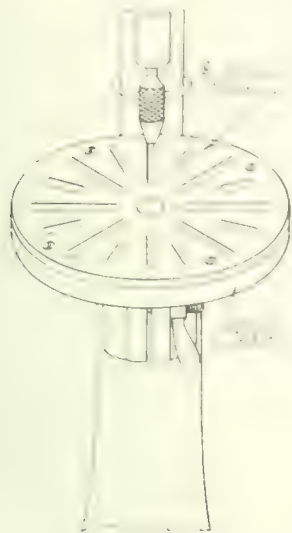


the most important points to be observed about the parting tools are that the cutting edge has clearance in every direction and that it is well supported in both grinding and setting.

### DRILL TABLE PAD

By Chas. H. Willey

A simple idea like this one shown in the sketch may save some reader many dollars if he adopts it. It saved many for the writer, so I pass it along. The drill press table when new is perfectly



DRILL TABLE PAD

smooth and true, and inside of six months, if all hands are allowed to use it at will, it becomes sadly abused, scratched, scarred, nicked, drilled into, and otherwise ruined as far as being able to set up and drill accurate work. Eventually it means a new table will have to be gotten. To protect the table in the first place would be best, so when we installed a new drill I obtained a piece of  $\frac{5}{8}$  boiler plate and made a false top for the table and bolted this on. It is never removed except when fine, accurate work is to be drilled.

### AN EMERGENCY LATHE NUT

By J. H. Houldsworth

It might be interesting to tell readers of CANADIAN MACHINERY how I made an emergency nut for the compound rest of a lathe which we wished to get into commission again at the earliest possible moment.

Having no time to cut one on the lathe, we secured an iron plate, and drilled a hole central in this plate, an exact fit for the spindle. In the case in point the size was 15-16 in. diameter.

Referring to the sketch, the remainder of the scheme is easy to explain.

We now constructed a framework of wood and placed the old nut on the spindle, then stood the assembled spindle as shown. We now made a regular mould of the affair, packing loam (or fireclay if desired) inside the framework constructed. We now withdrew the

spindle and nut, removed the nut, and replaced the spindle in the central hole; we now poured a good grade of hard babbitt into this mould, when we had a good temporary nut to operate our lathe until such time as we could make a permanent one.

### A KINK IN LAYING OUT WORK FOR THE SHOP

By F. A. McLean

The most widely used methods of preparing work for laying out are probably those in which chalk is used for coating rough surfaces, and copper sulphate solution for finished surfaces or template work.

Both of these methods have limitations, as the copper sulphate is no good for rough surfaces, and chalk is of little use on finished work, and in either case the chalk often gets rubbed off, making the marks hard to distinguish.

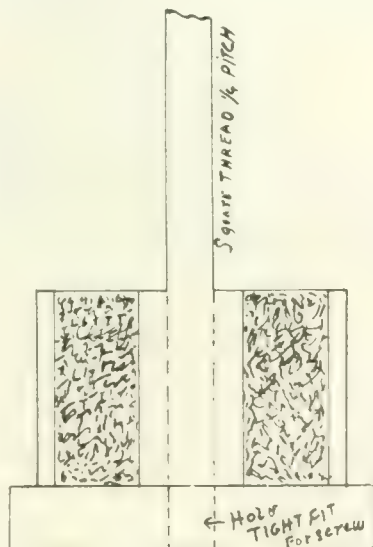
The use of a whitewash made of whitening dissolved in water will be found much more efficient than either of the methods just mentioned, as it will make a smooth coating on either rough or finished surfaces, and is not liable to be rubbed off accidentally.

More surface can be covered in less time as two applications of the brush will cover a surface that would require several minutes to coat with chalk or copper sulphate.

### OIL CUP FILLER

By Chas. H. Willey

Here is another scheme for using up empty 1-gallon oil tins, and the device shown in the sketch is one that will be found advantageous in filling oil cups and reservoirs.

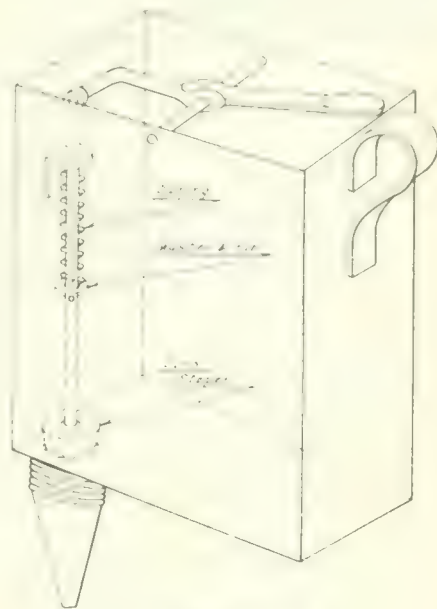


HOW THE NUT WAS MADE

To make it, the bottom of the oil container is cut out and then the arm and levers are made and fitted in. The place on the top edges of the device where the rocker shaft turns is reinforced by soldering on washers. The

levers and fittings are very simple to make from  $\frac{1}{4}$ -inch rod, the joints being made by flattening and drilling, and the spring is made from small size brass wire.

A funnel of small dimensions is soldered into the screw cap opening and the flow of the oil is controlled by the pressure of the lever which raises the cork that is secured to the end of the ver-



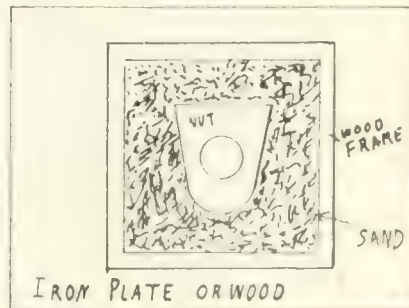
OIL CUP FILLER

tical rod. The sketch conveys the idea in clear form.

The Woodman and his axe are giving way to the engineer and his dynamite, for dynamite works much more easily and quickly than does the axe. You tie dynamite around the tree-trunk, then attach a fuse to it and set it off. Down comes the tree.

Colored Patient (in hospital)—"Boss, how do you all do yoh cookin in thah?"

Orderly—"Well, Sam, you know we



have the latest fandangled methods over here; we do our cooking by electricity."

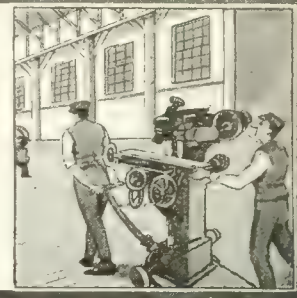
Colored Patient—"Hum, by e-lectricity, huh? Well, boss, you sho' ought to have given dem beans anotha shock."

—Truth.





## DEVELOPMENTS IN SHOP EQUIPMENT



**T**HE No. 10 multiple spindle drilling machine—with straight line adjustable spindles—as shown by the illustration on the opposite page, has been designed with improved features incorporated to meet the extensive requirements in a production machine for multiple drilling operations. This machine can be equipped with a group of spindles—with fixed centres—arranged in a straight line or in a cluster, or with a group of universally adjustable spindles arranged in a straight line, a rectangular or circular cluster.

### The Speed Mechanism

The speed mechanism is located in the column near the base so that vibration, ordinarily excessive in a belt-driven machine, is entirely absorbed. Power is transmitted to a vertical drive shaft from a three-step cone pulley through back gears and hardened steel bevel gears. A Johnson friction clutch is used to engage the power and to select the back gear, and these back gears, when used in conjunction with the 3-step cone pulley allow six speed changes. The vertical drive shaft is fitted with a sleeve gear through which the spindles are driven, and this sleeve gear is made to slide along the drive shaft with the spindle head as it is fed either up or down, which construction provides a drive closely coupled to the spindle head at any position on the column. Back gears are unnecessary and are not furnished when the machine is arranged for a direct connected variable speed motor.

### The Feed Mechanism

The feed mechanism is driven from the drive shaft through hardened steel bevel gears, and is housed in the column above the speed mechanism. It consists of two friction clutches and a jaw clutch.

The friction clutches are immersed in a bath of oil, the end thrusts being taken by S. K. F. ball bearings. By engaging one of the friction clutches the spindles are rapidly advanced until the drills come in contact with the work, at which point the jaw clutch is automatically

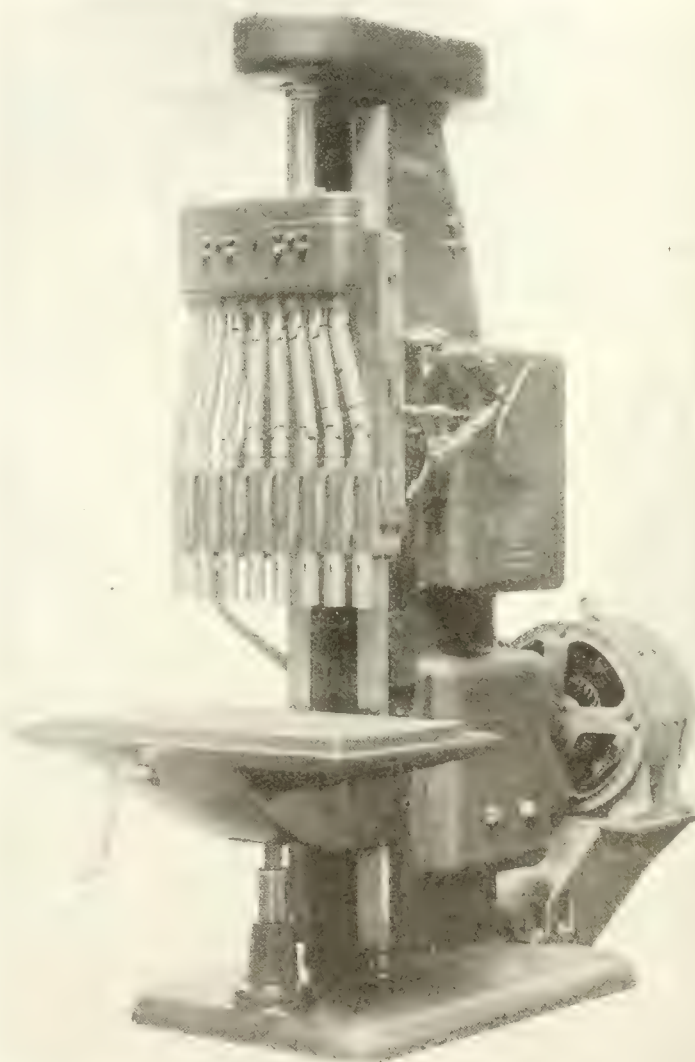
which prevents the possibility of more than one clutch being engaged at the same time. With this system of feeds, work having obstructions above the drilling plane, which the drills must clear when in a raised position, is accomplished with a minimum loss of time. Feed changes can be made by merely removing a gear case cover and changing two gears.

### The Feed Screw

The feed screw is large in diameter and of substantial pitch. It is operated by the feed mechanism through a vertical drive shaft and a train of spur gears. The threads on these screws are engaged by a hard bronze nut, which is immersed in a bath of oil and located low in the spindle head to prevent the threads from being exposed when the head is fed to its lowest position on the column. The advantage of this screw feed, which is located directly above the work, lies in obtaining an absolute vertical feed-thrust in central alignment with the spindles, thereby eliminating all side thrust to the spindle head and column ways and maintaining them in their original true alignment for a long period of use. End thrusts on this screw are taken in both directions by large S. K. F. ball bearings.

### The Spindle Head

The spindle head is a substantial casting of box construction and is securely gibbed to the column by a square lock method. This head supports the spindles and retains the spindle drive gears. Each spindle, when arranged to be adjusted, either universally or in a straight line, is connected to the drive gears by a telescopic drive shaft fitted with universal joints. When the spindles are arranged



GENERAL APPEARANCE OF THE MACHINE.

engaged to feed the drills through the cut. When through the cut the other friction clutch is automatically engaged to effect a quick return of the spindles to the starting position. The levers operating these clutches are interlocking,

the spindle drive gears. Each spindle, when arranged to be adjusted, either universally or in a straight line, is connected to the drive gears by a telescopic drive shaft fitted with universal joints. When the spindles are arranged



with fixed centres they are connected with the drive gears in a more direct manner without universal joints. The universally adjustable spindles are supported by substantial brackets, which are fastened in two "T" slots to a planed flange located at the lower end of the spindle head. Straight line adjustable spindles are supported by L-shaped brackets which are fastened to a cross-rail. The thrusts on all spindles are taken by S. K. F. ball bearings.

#### The Table and Column

The table and column are cast of a close-grained gray iron, and are of sufficient weight to ensure rigidity. The table can be furnished in either a knee or box type. The knee type is gibbed to the column by a square lock method, and is adjustable vertically. This adjustment is obtained by means of a crank lever, which, through a spiral gear mechanism, actuates a heavy jack-screw. The box type table is made with its top surface provided with "T" slots, to which the work or a jig can be clamped. The bottom part of this table is fastened to a planed surface on the base, which is also provided with "T" slots.

#### The Oiling Method

The oiling method consisting of a force feed, gravity flow and splash system combined—is made possible by the all-enclosed unit construction. The speed and feed mechanisms taken collectively, and the spindle head separately, are each provided with independent and self-contained oiling systems which ensure positive lubrication, and, as a consequence, economical maintenance. Each of these units are tightly encased and partially submerged in a bath of oil, while the bearings are lubricated by a force feed through individual leads which carry a sufficient flow of oil to flush all enclosed parts on its return to the reservoir.

#### Extra Attachments

Extra attachments, such as hand-feed for the spindle-head, motor drive, holding fixtures and tools, and equipment for cutting compounds or lubricants, including pump, tank and pipe fittings, can be furnished, but are not included in the regular equipment of this machine.

Following are its Principal Specifications:

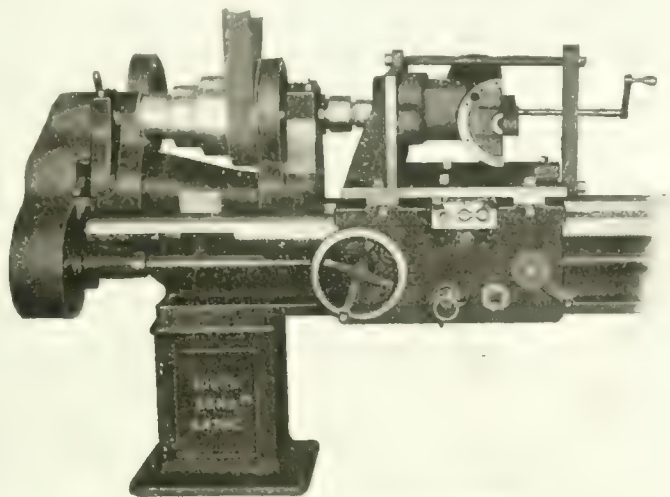
Capacity	Eight 3/4" holes
Minimum distance center to center of spindles	2"
Maximum distance center to center of spindles	22"
Vertical adjustment of collet in spindle	3/4"
Diameter of spindle nose	1 31/32"
Morse taper in spindle	No. 3
Diameter of joints	1 1/4"
Maximum distance nose of spindle to base	44"
Minimum distance nose of spindle to base	30"
Maximum distance nose of spindle to table	32"
Vertical travel of spindle head	14"
Distance center of spindle to column	9.970"
Table—vertical adjustment	12"
Table—working surface	20" x 36"
Back gear ratio	1 to 2
Spindle speeds—six	110, 137, 172, 220, 275, 344 R.P.M.
Electric motor—speed variable	.500 to 1500 R.P.M.
Width of belt used	4"
Feeds—change feed gears to suit character of work	

Any further information on this machine can be secured from the makers, the Defiance Machine Works, Defiance, Ohio.

#### SOUTH BEND CYLINDER-BORING ATTACHMENT FOR LATHES

The South Bend Lathe Works, 425 East Madison Street, South Bend, Ind., has just placed on the market an attachment by means of which any of its lathes can be quickly set up for reboring the cylinders of automobile engines. The illustration shows the attachment in place on a 21-in. lathe, but the device is applicable

with a cutting tool that will bore holes 1/2 to 1 in. in diameter and can be adjusted to the thousandth of an inch. If larger cylinders must be rebored a collar can be fitted in the end of the boring bar to hold cutters of larger size. The attachment is said to be of great value where cylinder boring is only done occasionally as it can be easily put in place or removed from the lathe.

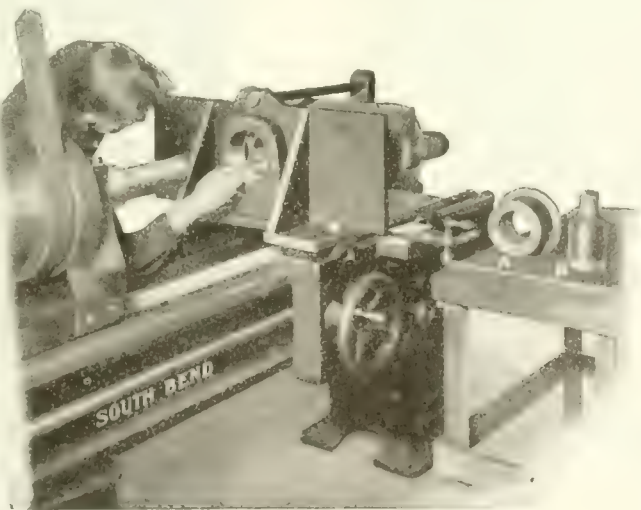


GENERAL VIEW OF THE FIXTURE.

to all lathes of 15 in. or larger. In putting the attachment in place, the compound rest is removed from the saddle, the jib being secured in position by means of two taper pins and bolts fitting the T-slots in the carriage. A feature of the device is the method of locating the work. There is a hole in the attachment in line with the lathe spindle. This hole is fitted with a removable bushing which is in its turn fitted with a plug, on the end of which a shoulder is turned of the same size as the cylinder bore. This bushing and plug are put in place with the end of the plug projecting through. The cylinder

A most ingenious little night lamp has been introduced by an American manufacturer of fixtures. This device is made of porcelain, and of an odd shape strongly suggesting a Japanese type of lamp. The shade is made an integral part of the base. In the base is a step-down transformer, which reduces 110-volt alternating current to 6 volts, so as to furnish current for a six-volt two-candlepower automobile type bulb. A simple switch is provided for turning the light on and off.

This little night lamp furnishes just sufficient illumination for dimly light-



CLOSE UP VIEW OF THE FIXTURE

der is placed over this plug and clamped in place, after which the plug and bushing are removed, allowing the work to be done. The boring bar fits into the taper of the lathe spindle and is provided

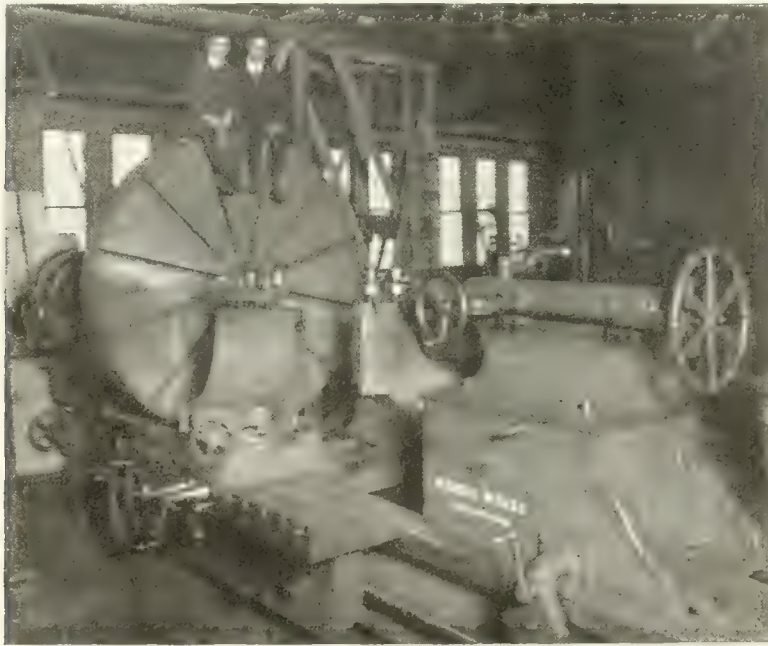
ing a medium-sized room, and the bulb is properly shielded so as not to be troublesome. The current consumption is so slight as hardly to make the average meter register.



### 96 IN. FIFIELD ENGINE LATHE

What is said to be one of the largest lathes in the world, a 96 in.-h swing triple-geared Fifield, has just been produced by the Wright Works, 1150 S. Washtenaw Avenue, Chicago, Illinois. The machine is depicted

as well as throughout the machine, are made of steel and the pitch and width of face gears increase in proportion to the load which the teeth have to stand in reducing the backshaft speed to turn the faceplate at the slow speeds required when turning large diameters.



GENERAL APPEARANCE OF THE LATHE

in Figure 1, which shows a front view of the lathe with faceplate removed. The machine is cone-driven from a backshaft, this procedure being necessary to obtain enough power to take the heavy cuts which a device of this size would be subjected to. An eight-inch belt from a countershaft running at 200 r.p.m. transmits forty horsepower to the spindle of the lathe. To reduce chattering, the spindle is made of cast iron. The theory of using cast iron is that it is less elastic and therefore will not spring on heavy cuts and thus reduces chattering. To compensate for the strength of the steel spindle the spindle is of generous proportions, the front bearing being 16 in. diameter and 24 in. long and the rear bearing 14 in. diameter and 20 in. long.

The lathe is triple geared and all changes are obtained by moving the hand-wheel, which is conveniently placed in front of the cone pulley, thus making all changes within easy reach of the operator. The handwheel is geared to a lever shaft, which reduces materially the effort required to shift the back gears into their desired positions. Only one of the changes is through sliding gears, the balance being by means of massive tooth clutches. The gearing and cone pulley is designed so that all speeds are in geometrical progression, the slowest speed being 0.75 r.p.m. and the fastest speed 76 r.p.m. Twelve speeds are obtainable through the four steps cone pulley and triple gearing with a ratio of 1.52 between each speed.

All of the gearing in the headstock,

The triple gear which engages the faceplate internal gear is of one diametral pitch and has a face width of six inches.

Every shaft in the headstock runs in phosphor bronze bearings and is well lubricated by means of sight feed oilers, which are in the operator's sight at all times.

The feeds are also in geometrical

lated by means of the two levers shown in the illustrations, which move in either direction, giving four feeds of 0.025 in., 0.050 in., 0.100 in., and 0.200 in. per turn of faceplate. More feed may be had by changing the regular feed gears with the thread cutting gears. Twenty-four different threads may be cut by means of changing gears. All the gears are guarded by covers or guards, which are made conveniently removable where necessary, while the change gear guard is provided with a door.

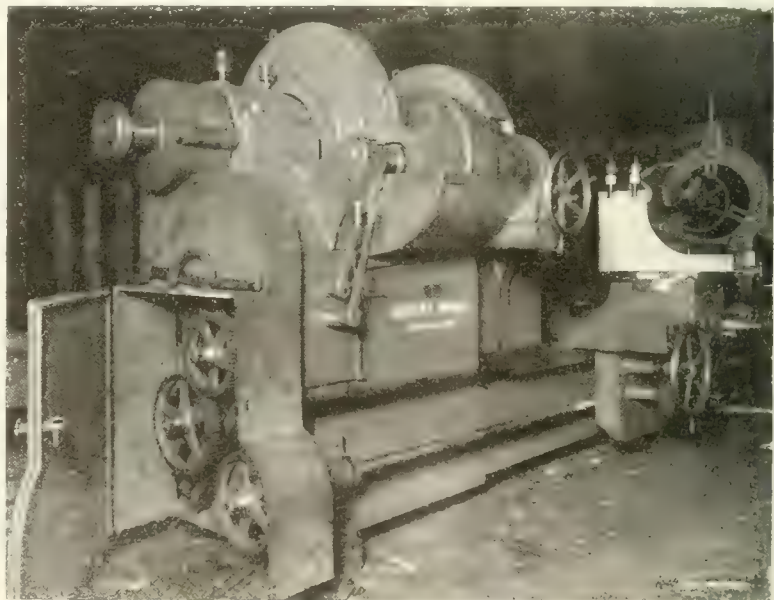
The carriage in the illustrations is equipped with two compound slides, which may be fitted with power angular feed at the request of the purchaser. The carriage bears upon the ways for a length of 90 in. The apron is made of steel gears and is bush throughout.

The lead screw is kept from buckling by means of supports, which are adjustable and placed at about ten feet apart.

The tailstock, like headstock, is of box construction and is moved easily by hand by means of a geared device, which engages the teeth in the rack of the bed. The tailstock spindle is moved by a handwheel, which is placed convenient to the carriage.

A massive steady rest is supplied with each and every machine.

The bed is ribbed throughout with box sections and is fitted with a rack down a centre rib, which engages a pawl on the tailstock, removing the thrust of a cut from the clamps of the tailstock direct to the bed of lathe. The bed provided for the machine in the picture is 48 feet long and will take 34 feet between centres. The total weight of the machine is 150,000 lbs. An idea of the



ANOTHER VIEW OF THE MACHINE.

progression and are obtained from a quick change gear box, which is integral with the headstock. They are manipu-

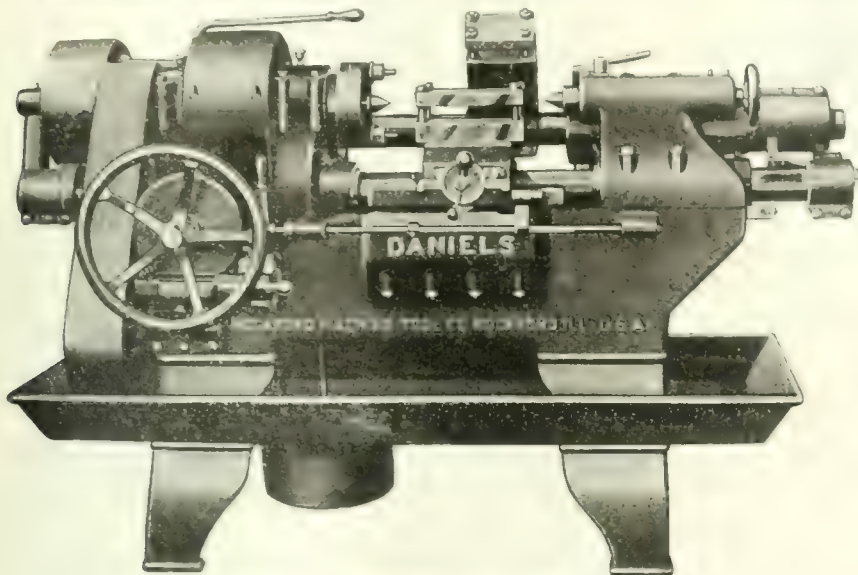
massiveness is furnished by Figure 3, which shows two men sitting on the faceplate.



**"DANIELS" AUTOMATIC LATHE**

The automatic lathe illustrated, which is intended for the rapid production of duplicate parts in large quantities, is a recent product of the Rockford Machine Tool Co., Rockford, Ill. This machine was designed by Lee G. Daniels, and, while having only a 14-in. swing over

speed. The drive is to a friction pulley and then through a pair of helical gears to the spindle. The headstock is cast integral with the bed. A heavy steel bar bearing directly in the head and tail stocks serves as a support for the side carriage. This is solidly and permanently clamped to the bar. The carriage



GENERAL APPEARANCE OF MACHINE

the carriage bar, is said to be built on 22-in. heavy-duty lathe lines in order to withstand severe service. After being set up for an operation, the work, either centred or mounted on an arbor, is placed in the machine, the speed clutch thrown in, and the feed worm lifted into position; after which the machine goes through its operations and the tools return to their starting position.

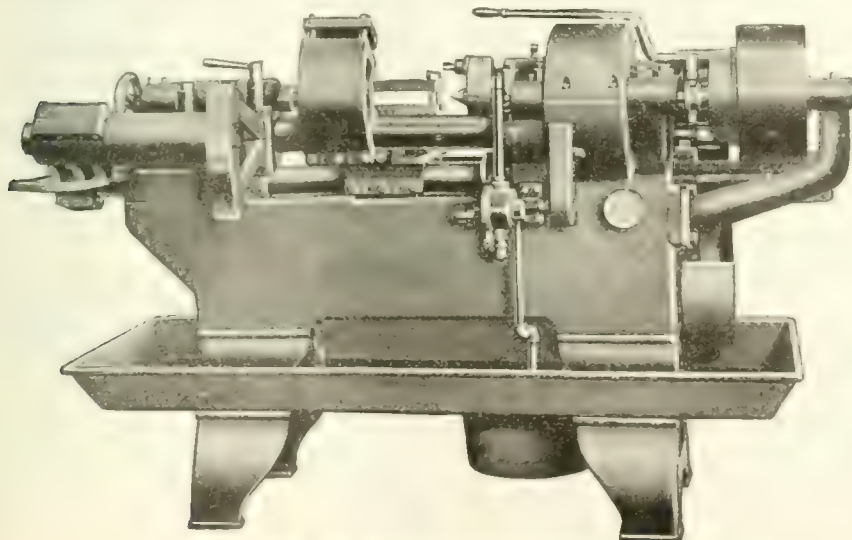
The side and right-angle carriages are arranged to carry multiple tools, the side carriage for turning different diameters and the right-angle carriage for facing and recessing. It is possible to use four or more tools in each carriage, all operating at the same time.

The machine is of the one speed and feed type. If necessary, change gears can be used to vary the feed, but it is necessary to change pulleys to alter the

also bears on a hardened steel way at the front of the bed and when the feeds are tripped the carriage is automatically moved away from the work so that the tools will not drag in returning to the starting position. Special hardened-steel ways can be furnished to give the work taper, convex or concave form if desired.

The right-angle carriage is mounted on a bar supported in bearings in the head and tail stocks, a segment cam on this bar being actuated by a roller from the side carriage bar. The tailstock is of the four bolt type cast in one piece and fitted with a taper gib.

The bars for supporting both carriages are finished by turning and grinding from high-carbon forged-steel bars and are 3½ in. in diameter to insure rigid support for the cutting tools.



VIEW OF MACHINE FROM REAR.

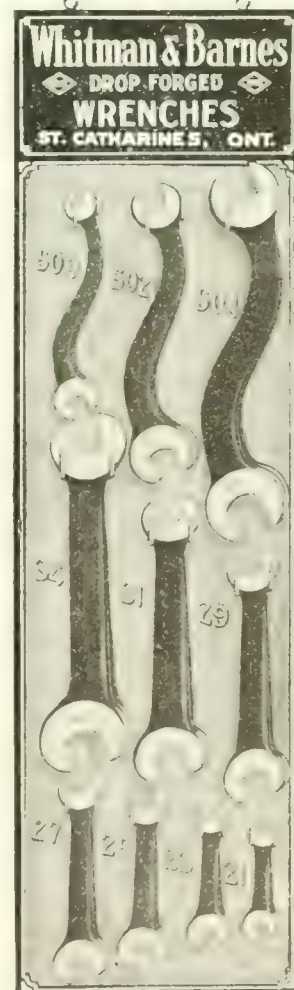
A lubricating system is provided, the oil pump being driven by a chain from the clutch shaft. Flexible tubing for delivering the lubricant to the work is regular equipment.

**"A & B" WRENCH BOARD**

The Whitman & Barnes Manufacturing Company, St. Catharines, Ont., are putting out an attractive new board for displaying their drop-forged wrenches. The background is light golden oak, the display card is black with gold lettering.

The wrench board is designed to be of greatest assistance to both the dealer and the purchaser. Each wrench number is plainly marked in red. Wrenches may be had either semi-finished or black enameled finish. As the new board is only 8 inches wide by 28½ inches high it may be used to advantage in the window as well as in its more usual location on store column or walls.

The assortment of ten sizes of double head wrenches, three of each size, is not intended to be complete or to take the place of the dealer's regular stock. It does, however, include the most popular sizes for general use, and so serves as a guide to the purchaser as well as



GENERAL APPEARANCE OF THE BOARD.

a silent but effective salesman and stock-keeper for the dealer.

A handy little booklet describing the new wrench board will be mailed to dealers on request.



# The MacLean Publishing Company

LIMITED

(ESTABLISHED 1887)

JOHN BAYNE MACLEAN, President. H. T. HUNTER, Vice-President

H. V. TYRRELL, General Manager.

PUBLISHERS OF

## CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly journal devoted to the machinery and manufacturing interests.

B. G. NEWTON, Manager.

A. R. KENNEDY, Managing Editor.

Associate Editors:

W. F. SUTHERLAND T. H. FENNER J. H. RODGERS (Montreal)

J. H. MOORE.

Office of Publication, 143-153 University Avenue, Toronto, Ontario.

Vol. XXII. TORONTO, October 2, 1919 No. 14

### PRINCIPAL CONTENTS

Manufacturing the Ball Line of Pipe Machinery	337
Description of Mahr Calorizer and Furnace	341
Nichrome Castings for Heat Treatment	343
Special Announcement on Drafting Course	345
Canadian Machinery Drafting Course—Part I.	346
Welding and Cutting	349
What Our Readers Think and Do	352
Developments in Shop Equipment	354
Editorial	358
Market Developments	360
Selected Market Quotations	78
The Small Town That Advertised and Became a City	80A
Industrial Developments	80H

## The Good-will of the Men

WHY is it that there are some of the steel mills of United States running 100 per cent. to-day, while others were shut up tight the first day of the strike?

Now there is no chance work about this. Organizers and strike leaders are just as eager to tie up one mill as another, although it is a fact that the strike is aimed primarily against the Steel Corporation.

At Vandergrift, for instance, the strikers made no headway. George McMurtry was at the head of this mill long before it went into the Corporation. He made a study of men. He wanted to make life pleasant for them. His men were greater to him than the steel they were to turn out.

At Middletown, the home of the American Rolling Mills, the influence of such a man as George M. Verity is seen in the present crisis. That mill is running and chances are that it will continue to run. That mill is managed not for the one purpose of turning out a product that is recognized as par excellent, but it is run in such a way that to turn out anything else would cause the men to feel guilty of wounding a friend in his own house.

When is industry going to learn this lesson?

Contented workmen will turn out a good product. Men who are on the "edge" all the time will not.

The successful manufacturer to-day is out to buy more than eight hours of a man's time. If his interest in the human element in his establishment begins and ends as the men pass in and out by the time clock, he is going to get a very perfunctory service. He is not going to have an organization that will stand behind him in spite of all that strike-agitators can do.

Don't say that it cannot be done. Do not take refuge

in the experience of someone who has made a half-hearted attempt.

Men are still men. They can be appealed to as such. They can see when a firm comes to them on the "dead level," and they have also learned to look a gift horse in the face.

You cannot run your shop on the card-index plan. A man must be something more than a number on a card or a necessary load on the pay roll.

Do you know your men? Do you know anything of their living conditions? Do you know if they are up against a big load in the way of sickness or hard luck?

You say you have too many to know in this way. Then that is all the more reason to set at this work systematically.

There are Canadian manufacturers who know their men. They can get out in the shop or the mill and call most of them by the first name. Do they lose prestige? Do the men get too familiar? Not much! These men are having a good time every day, and at the same time they are wisely practising a commendable sort of self-preservation.

## I Don't Know

THE superintendent of a fairly large shop in a Canadian city went to one of the mechanics not many days ago. He said, "We need a new key-seater in this shop. What make would you advise?"

That mechanic did not have to spend a cent to have all this knowledge at his tongue's end. The firm placed a number of mechanical papers at the disposal of its men. All that was necessary was to apply at the circulating library.

Right then was his chance to have told the superintendent what he thought. He should have been able to tell him what he preferred and why. He knew the class of work done in the shop; knew what was necessary, but—

He said: "I don't know."

And right there he passed up a chance to become an authority on what was good shop equipment.

The superintendent was in quest of information. He was out to find a mechanic who recognized that this is a day of machine production—a day when shops must have the machine suited to their work.

He wanted to know which was THE machine for their plant, and why.

Now it was quite natural that he should go out and ask a mechanic in his own shop. The superintendent may have had something else in his mind, for promotions come at the most unexpected moments.

But that mechanic, at the first test, in the first round, passed along his chances when he said: "I don't know."

This is the day when the man who is going to the top of the heap will be able to say: "We need this make of machine. It will do the work here because—" and then he goes on to tell why.

The advertising and new equipment pages of a paper like CANADIAN MACHINERY are full of the newest developments in the machine tool field. They are an education to the mechanic who is bound on getting into the "I know" class. They are a sealed book to the "I don't know" mechanic.

The "I don't know" list is a long one. It has few men who can reach very far through the cashier's wicket on pay day. The "I don't know" chap has only 44 or 48 hours of his time for sale each week. He has nothing else of value to his firm.

The "I know" man is in demand. He has his skill plus his information on up-to-date equipment and methods.

If you want to enter the field of larger service, get away from the monotony of production—get in the "I know" class. It is entirely a personal matter. No one else can do it for you, and no one can keep you from learning.



## Is There To Be No Limit?

THE United Mine Workers of America, at the Cleveland session, state their programme as follows:—

Sixty per cent. increase in all mine wages.

A limit of six hours up in the day's labor underground.

A five-day week, with time and a half for overtime, and double time for work on Sundays and holidays, and important improvements in conditions of labor.

If these demands are not met the miners will strike on November 1.

The sixty per cent. increase in pay and the decreased hours of labor mean easily a hundred per cent. increase in the price of coal.

Readers may at first be inclined to take these demands with some degree of levity, but there is the utmost seriousness in the presentation of the demands, and in the whole proceedings.

This continent needs coal—needs a lot of it, and needs it right now. The miners propose to stifle production and enormously increase the cost.

They propose to saddle every worker in Canada and United States with a load that he cannot carry and decently exist.

The strike, as a legitimate weapon, is being abused beyond words. There have been times, many of them, when a strike was the only thing to which labor could turn and maintain any reasonable degree of self-respect.

The continued resort to the strike by men who have not a large enough grievance to warrant this extreme measure is making the phrase "they've gone on strike" a word that arouses little sympathy and less support.

President Tom Moore, of the Trades and Labor Council of Canada, at the Hamilton convention, had this to say:—

"A number of leaders of labor and those who follow them have been repeatedly warned of the economic danger of too frequent or too wide a use of the strike weapon. They have been told that it is inimical to production and to the best interests of the nation, and so will ultimately rebound upon themselves. They have not, however, been sufficiently warned of the danger they run of spoiling their final and best weapon of defense by its too great use and by attempts to force by its means decisions that such a weapon ought never to obtain."

The very word "strike" is being stripped of its real meaning, and robbed of its strength in portraying to the mind the idea of a struggle of the weak against the strong.

The wise labor leader cannot afford to take "the public be damned" attitude. The public in the last analysis hold a tremendous amount of power that they have never yet exercised, but it looks as though it might be necessary to organize and harness some of this power for the purpose of protecting the great mass of the community—the common people.

## Back to the Stone Age?

HERE is an item from the "society" columns of a Toronto newspaper:—

"Five hundred dollars was paid for an evening cloak and four hundred for a gown one day this week by a well-known Toronto woman."

The chances are that had the paper inserting this paragraph thought seriously about present-day conditions, about the volcano of unrest on which we are sitting, or of the things men and women are thinking about and

saying, the paragraph would never have found its way into print.

There was a time when people took it for granted that it was all right for some people to have all they needed, and more, while others had not enough to keep body and soul together.

During the days of the war much was said of the breaking down of class lines, of the levelling of the people to the plane of service and sacrifice. In fact, were one to have taken seriously all that was said, it would be reasonable to expect that we should now be in an era quite different to that before the war.

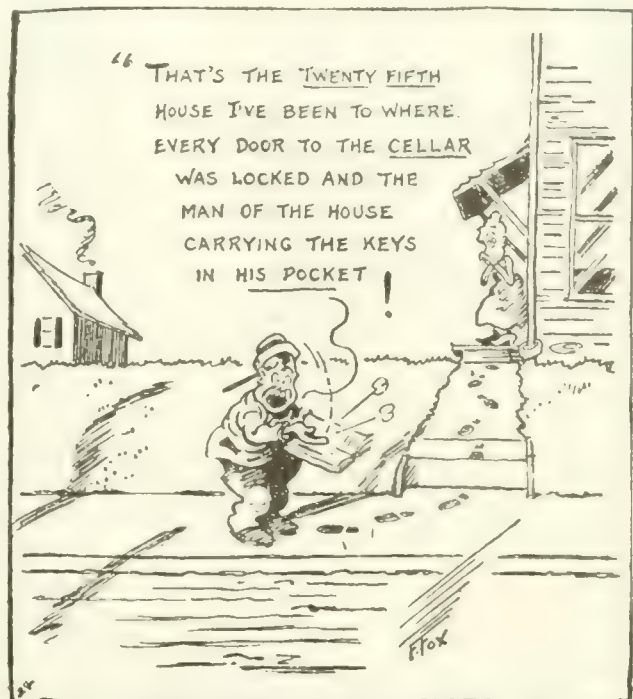
But that was a war-time dream. The sacrifice was made, but the selfishness returned. It is here to-day. It crops up all over and will not be downed. The pursuit of dollars is once more the centre and circumference of man's life.

And so we have this vulgar display of wealth again. Oh, yes, it is interesting to read of \$900 being paid for a gown and an evening coat! In fact it might be more so were it not a fact that one can see women with market baskets going to butcher shops and stalls looking for cheap cuts of meat, and turning away again with empty baskets because there happened to be no cheap cuts on that day.

This old world is in the melting pot, and the outpouring has not yet come to pass. Nor are we going to have the dross skimmed from the gold by the poor vaporing of the social columns of the daily press, where some censor has the job of selecting the social sheep from the unfortunate herd of goats that have committed the awful crime of not being wealthy.

It is a fact that this old world hungers for love, for the handclasp that has a heart-throb behind it, for genuine worth stripped of its trappings, and for manliness that is saturated with integrity and honor.

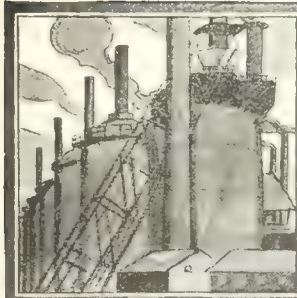
All things that make for the bringing to the surface of these attributes are worthy of our greatest encouragement, while everything that, in these times of uncertainty and unrest, tends to build anew class lines, emphasize social distinctions, or place dollars above character is unworthy of a place in the thought and acts of serious-minded men and women.



THE METERMAN IN A DRY LAND.

—From the Youngstown (Ohio) "Telegram"





## MARKET DEVELOPMENTS



### The Steel Strike Touches Canadian Markets

Firms Using Much Material May Have to Pay Higher Prices—  
New York Reports That Machine Tools Are on the Level of the  
War Period and in Some Cases Higher

**H**OW long can Canadian industry stand the steel strike in United States? That question is concerning a lot of people just now. There are plants that will be touched very quickly, while there are others that will not feel the pinch for weeks yet. On a broad basis, though, it can be accepted as a fact that it is not possible for industry on this side of the line to prosper while the same business across the border is in the throes of a desperate strike.

The strike came at a bad season of the year for Canadian business. Warehouse stocks are very low in many lines. Roughly speaking, plates, tubes and large structurals are the lines that we must import, and there are certain gauges in sheets that are much in demand, with only a limited production capacity in Canada. Buying from warehouses has been very brisk for several weeks,

in anticipation of strikes, with the result that these places are pretty well cleaned out.

Prices will be firm and higher on many lines. One user of sheets, for instance, who wanted 20 tons, found that by the time he had made the rounds of several houses to secure his requirements, he had to pay \$400 more than he figured on. Although the actual lists may not be altered, the chances are that premiums will be secured on a good many lines where there is any chance of delivery.

It might be supposed, at first glance, that Canadian steel mills would benefit largely from the strike. They may for a short time, but not in the long run. For instance if a factory cannot secure plate, it will be only a matter of time before it will be closed off, and out of the market as a buyer of those lines the Canadian mills are in a position to ship.

### TROUBLE IN ENGLAND WILL HURT OCEAN SHIPMENTS FROM CANADA

Special to CANADIAN MACHINERY.

**M**ONTREAL, Que., October 2.—In addition to the uncertainty that has followed the inauguration of the steel strike in the steel districts in the States, the action of the railway men in Britain has added to the unsettled condition in this district. Not that the situation here has been directly affected, but the consequence of these disturbances will eventually be reflected throughout the industrial world. The immediate result of the strike in England will be to create a congestion at ocean terminals that will cause the Government to place a virtual embargo on imports and exports. Already the ports in the Old Country are unable to take care of the material that is accumulating, and restrictions are looked for every day that will curtail the activities until the situation can be relieved. Officials at the port here are looking for some action that will call for revised regulations in regard to shipping to British ports.

#### Strike Shows Little Effect So Far

Despite the fact that the steel strike in the States is casting a cloud over the activities in this district, the business here has shown no outstanding developments as a result of the unsettled state

prevailing in the American steel centres. The conservative attitude that has been only too pronounced during the past few months has become additionally emphasized during the week just passed. The present demands, however, are not of a character that activities would be suspended in consequence of the close-down of the United States mills. It is learned here, that, apart from the heavier classes of materials, such as plates and large shapes, the requirements of the trade can be supplied from the Canadian mills, or stocks that are in the hands of dealers. In some respects the strike has been foreseen, and many consumers have protected themselves by covering their requirements for weeks ahead. This, with the light volume of present business, will assist in tiding over what would otherwise be a serious situation. So far there has been no alarming conditions here as the mills have been able to supply all the needs for immediate demands. Should the strike extend for a long period the effect would be first felt in plates and shapes, and the demands for this material here is very light at present. While it is impossible to predict what will eventually take place, the trade here is quite optimistic,

and many believe a settlement will be reached within a very short time. However, should the present trouble spread, the market would undoubtedly strengthen and price quotations would likely advance. Dealers here are holding to current quotations and do not anticipate an advance unless a serious turn develops across the line.

#### Metal Showing Weakness

The metal situation here has felt the effect of the unsettled condition now prevailing in the States, not in a direct way, but consumers are adopting cautious methods until affairs become more stable. The demand has shown a slight falling off, and as a result dealers are quoting weaker prices on all the metals. Copper is now quoted at 25½ for lake, and 25 cents for electro and castings. Tin is down 1 cent, and the price asked is 59 cents per pound. Spelter is now 9½, this being a decline of ¼ cent on the week. Antimony shows a similar decline and is quoted at 9¼ cents. Aluminum is lower and the quotation of 33 cents represents a decline of 2 cents per pound.

#### Little Scrap Movement

Dealers here are closely watching the developments across the line, but the effect so far has only been one of passive interest as the market here has not been affected by the tie-up of the producing mills. It is difficult to state what will



## Six Post Readers in New Cabinet

**F**ORMER Finance Minister Cashen, who, following the crisis which led to the resignation of Premier Lloyd, of Newfoundland, has been called upon to form a Ministry, has already selected nine members to act with him.

Six of these, including the Premier himself, have been regular readers of THE FINANCIAL POST for some time.

This does not only indicate the quality as well as the extent of our circulation, but indicates also that men who carry big responsibilities find THE POST of value to them. It indicates, therefore, the approval which is meeting the effort of our editors and the great importance and value of the business information to which subscribers have access through the columns of THE FINANCIAL POST.

When the Government of Newfoundland was recently arranging the flotation of a \$5,000,000 bond issue THE POST'S opinion as regards some methods of marketing was quoted by members of the Cabinet.

## The Financial Post at Ottawa

**I**N the Dominion House of Commons the other week the attention of the Government was drawn to an article in THE FINANCIAL POST containing a reference to the financing of Roumanian orders through an agency established in London by Sir Clifford Sifton. Sir Thomas White mentioned that in reading his FINANCIAL POST that week, he had formed the opinion that the reference was to private marketing of bonds.

## Keen Business Men and Cabinet Ministers Read the Post

**S**IR THOMAS WHITE, with other Cabinet Ministers and prominent Canadian men of affairs, have found THE FINANCIAL POST of swift and sure business service. When you "get down to business" you want the plain facts—all of them—without frills—and quickly. You get them like that in THE POST. THE FINANCIAL POST will keep you informed on Canadian business matters in a way unrivalled by any other publication. Send for a subscription to-day. The price is \$3.00 per year, and you have only to fill in this form:

The MacLean Publishing Co.,  
1441 University Ave. Toronto.

Send me THE FINANCIAL POST every week till further ordered. I will pay subscription price, \$3.00 per year, on receipt of bill, or you may draw on me for this.

Name \_\_\_\_\_

Address \_\_\_\_\_

## Acid Electric STEEL CASTINGS

Acid Electric Steel Castings show superior ability to resist wear and crystallization. They are smooth in texture, free from Blow Holes, and machine perfectly. We specialize in

## Railroad and Other High Grade Castings

up to 15 tons, any specification. Electric Steel Castings COST NO MORE than ordinary Steel Castings.

*Prices on Application—Prompt Deliveries*

## The Thos. Davidson Mfg. Co., Limited

Steel Foundry Division, Lachine Canal

Head Office: 187 Delisle St. MONTREAL  
Phone Victoria 1492

**MORROW**

**SCREWS**

**MORROW**

Don't Be Careless In  
Ordering  
**DRILLS  
SCREWS  
NUTS  
FILES**

Say **MORROW'S**  
and *mean it.*

No reliable jobber will  
substitute.

You be the judge.

**John Morrow Screw &  
Nut Company, Limited**

**Ingersoll - Canada**

Buy only Ingersoll Files  
*"They Cut Faster and Wear Longer"*

**MORROW**

**NUTS**

**MORROW**



take place should the strike continue for any length of time, and it is hard to get any dealer to commit himself in this connection. The feeling is general that the strike will be of short duration, and for this reason the dealers are reluctant to speculate on the market. They are willing to let present prices stand for another week.

## MUCH INTERESTED IN STEEL STRIKE

Canadian Firms In Some Lines Must Secure Their Supplies From U. S. Mills

TORONTO.—The strike in the steel mills of the U. S. is the big cloud on the horizon this week. Warehousemen want to know how they are going to make out. Firms that have orders in the U. S. mills at the present time want to know what chances they have of getting deliveries from them, and the firm that wants plate rolled to keep the shops going are keen for any intimation of how serious will be the curtailment of output at the mills.

So far the strike has not hurt this country. But it would be folly to say that Canada is going to be free for any length of time. Indications point clearly to the fact that if the trouble continues, this country is going to be seriously affected.

### How It Works Out

The Canadian steel mills should get a larger tonnage of material than they are capable of handling. If they are in shape to handle much more is not certain. For instance, one firm—an American concern that is putting a branch in Canada in the Windsor district—was going to buy 50 tons of sheets. The order in the natural course of events was going to be placed at the U.S. mill where the parent concern had been securing material for some years past, and in the use of which they were accustomed. There is some urgency in the order, and it will go to a Canadian mill. There is no reason to suppose that this one case will not be duplicated many times.

### How the Stocks Stand

Warehouses report that their regular supply of plates has been largely shut off, although there are some deliveries coming through yet. That is to be expected as there would be a large amount of material practically ready for shipment, and some of it actually on the way when the strike started, and of course, there are mills that are making shipments even yet.

There is very little plate in the warehouses of this country, and the fact that there has not been very heavy buying is responsible for this. Jobbers preferred to do an import business and pass on orders for mill shipment rather than stock heavily in a rather uncertain market. During the past few weeks when it seemed probable that there would be trouble in getting material from the United States mills, there has been a run on the warehouses carrying wanted sizes and gauges, and so it is that plate stocks in the warehouses are low—very

## POINTS IN WEEK'S MARKETING NOTES

New York reports that there have been several increases announced in the price of standard tools, and that in many cases the prices are now even above those that prevailed during the war period.

Canadian manufacturers using much material that is imported from U. S. steel mills report that in most cases they have enough stock on hand to last them for some weeks to come. They admit that if the strike is continued for any great length of time, however, matters will be serious for them.

Pittsburgh reports speak hopefully of the strike in the steel mills falling through.

The steel strike is having its effect already on Canadian materials. Increased prices are reported on sheets, and buyers are in some cases willing to pay premiums for delivery.

A new list is out on steel tubes, showing increases. The stock of tubes in Canada is particularly low at present, especially in two, three and four inch sizes.

Montreal fears that the strike in England will bring out embargoes which will tie up ocean shipping.

low in fact, with very little prospect of getting them replenished for the present.

It would not be surprising were prices to stiffen at once. For some time past there has been more or less juggling with the prices of plate, which has been the weak spot in the whole steel list. Business, while nominally at 2.65, has in many cases been going across at 2.50. The strike situation will no doubt take care of this tendency, although the selling agencies of the mills state that they do not intend to enhance prices on the strength of the strike.

### The Case of Sheets

The case of sheets is different, as this is an article that has some capacity in this country. There is no guess-work in sheets, though, because they are going to go up. In fact, they have already gone up. Just who to blame for this order of things is hard to state. It is a question much the same as who is the greatest offender, the man who takes or gives a bribe. Very often the purchaser, finding that his plant is very much in need of a certain line, will pay a premium for delivery, in which case the seller is relieved of the embarrassment of approaching this rather delicate question.

But here is a case in point. One On-

tario firm wanted 20 tons of sheets, and they were very anxious to get them. That twenty tons is costing the buyer, by the time that several warehouses have contributed their quota, something like \$400 more than the former price which was good up to a few days ago.

There are not many galvanized sheets in several of the warehouses, and prices vary a little on these, while the chances seem to be that, with black sheets, their raw material, going to a higher level, the galvanized product will move in the same direction. Sheet stocks are very low at the moment. This is due to the fact that there has been such a rush for sheets in the last couple of weeks that the warehouses have been brought down to very little to choose from. Many of the orders coming in are for No. 10 gauge, and for this there is little capacity in Canada, one mill in Nova Scotia alone being able to do this up to a limited sized strip. This is in reality a thin plate, and is used largely for smoke stacks, tanks, etc.

### Tubes Not Plentiful

The strike has found the stock of tubes in Canadian shops and warehouses "shockingly low" as one of the sales managers put the case to CANADIAN MACHINERY this week. They are low in sizes and qualities, because there has been a very heavy demand. In this case there is no reason to doubt what prices are going to do. Already there has been a ten per cent. increase announced by the larger warehouses on the other side of the line. Two, three and four-inch tubes are wanted in this country, but they are not to be had with any degree of certainty or freedom in regard to the quantity ordered.

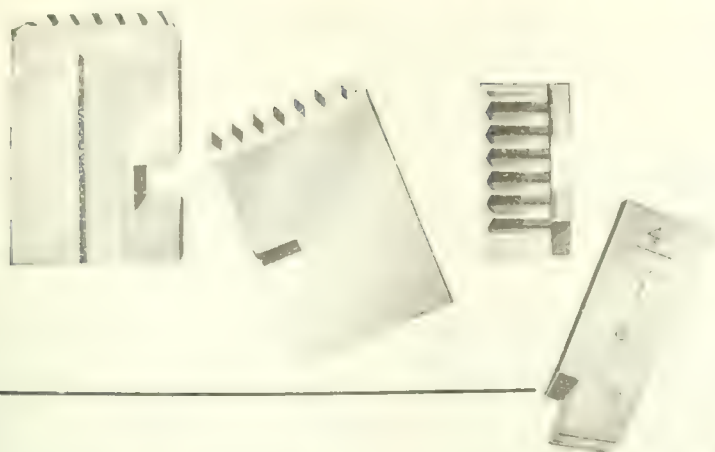
It looks as though the strike had come at a bad time for the Canadian warehouse trade. CANADIAN MACHINERY knows that there are large orders across the line, as warehouses had decided in several cases to stock up ready for whatever uncertainty might come in the winter months from transportation problems. Deliveries are not coming through against these orders, and as a result, they have little to offer their customers.

### Doing a Good Business

Dealers in machine tool supplies report that they are doing a lot of business, and that it is well distributed, taking in a large number of industries.

And while speaking of small tools, such as certain makes of drills, one Toronto dealer remarked to CANADIAN MACHINERY this week: "This is a line that no person seems to be making money out of. I know for a fact that the man who sells them is now doing little more than breaking even in many cases, while it hardly seems likely that the makers are showing a decent profit. There has been too much competition and cutting to meet local and special conditions. I wish the makers would have some understanding, for as matters stand at present there are cases where the customer is actually in a position





## Sharp Chasers Cut Clean Threads

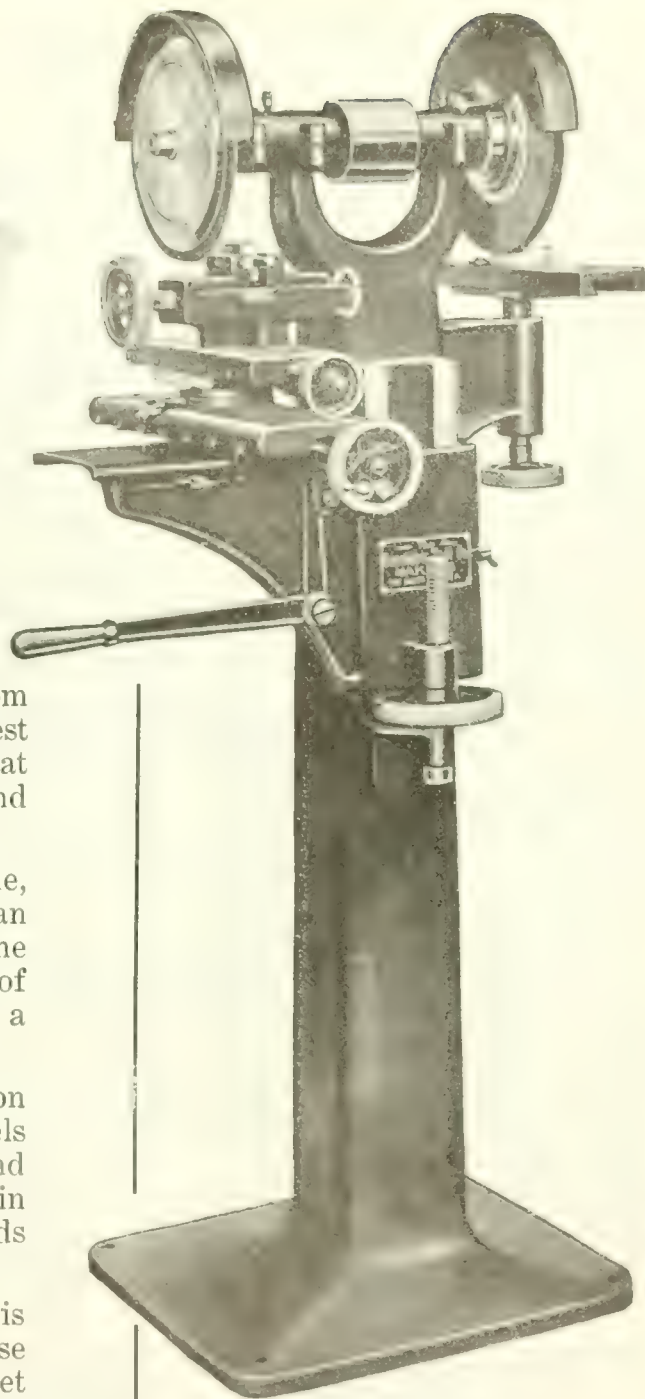
Accurate, uniform threads result only from dies which are maintained in the highest state of cutting efficiency. This means that chasers must be kept sharp, and ground uniformly.

Even if just touched up from time to time, the chasers respond splendidly, with clean threads. And with this machine — the Geometric Chaser Grinder—the matter of keeping threading tools up to scratch is a comparatively simple matter.

Various makes of chasers can be ground on this adaptable machine. The two wheels permit the easy grinding of both milled and tapped chasers. In addition, the plain wheel lends itself readily to various kinds of tool grinding.

Uniform grinding of a set of chasers is purely a mechanical matter through the use of adjustments which can be accurately set to govern the grinding of an entire set of chasers.

*The Catalogue describing this machine is a mine of information on chaser grinding. Write for it*



**THE GEOMETRIC TOOL COMPANY**  
NEW HAVEN CONNECTICUT

*Canadian Agents:*

Williams & Wilson, Ltd., Montreal. The A. R. Williams Machinery Co., Toronto, Winnipeg, St. John, N.B.

*If interested tear out this page and place with letters to be answered.*



to name the price which he is going to give you his business."

It would not be surprising were something come along these lines, not with

the idea of creating a combine to boost prices, but simply to put the whole business on a fair basis where all would be treated alike.

## GET ON THE JOB

## NEW YORK REPORTS SOME TOOLS EVEN HIGHER THAN IN WAR TIMES

Special to CANADIAN MACHINERY.

NEW YORK, October 2.—The effect of the strike in the steel industry upon machine tool trade has been to reduce the number of inquiries. On the other hand, a very fair amount of business, most of which has been pending for weeks, has been closed within the past week. The falling off in inquiries indicates that manufacturers in metal working lines will not make new plans until the outcome of the steel strike is definitely determined. A victory for the unions would be a severe blow to American industry, and, while no such result is expected, there is a degree of uncertainty in the outlook that will hold up business. What the steel companies now fear is that President Wilson may attempt to take a hand in the situation and suggest an arbitration commission. The steel manufacturers have nothing to arbitrate. The issue in this strike is clear-cut—it is a fight on behalf of right-thinking Americans against the despotism of labor leaders who are un-American in their ideals and aspirations.

The thorough publicity given to the revolutionary character of W. Z. Foster, secretary of the strike committee, and the statements of John Fitzpatrick, chairman, to a Senate committee that labor is aiming at the socialization of all basic industries, has focussed public attention upon the crisis in Governmental affairs that might come through a victory for the unions in the steel strike.

Among domestic buyers of tools in the past week may be mentioned the Dusen-berg Motors Corporation, Elizabeth, N.J., now a part of the Willys Corporation; the Hendee Manufacturing Co., Spring-

field, Mass., manufacturers of motor cycles; the De Laval Separator Co., Poughkeepsie, N.Y.; the Sharples Separator Co., West Chester, Pa.; the Crown Cork and Seal Co., Baltimore, Md.; the E. W. Bliss Co., Brooklyn, and the Bessemer Gas Engine Co., Grove City, Pa.

In the export field there is considerable inquiry but not much buying. The J. G. White Engineering Corporation, New York, is placing orders against a \$250,000 list for Switzerland. An export company is asking for quotations on about 100 or more tools for locomotive and car repair shops in South America, and a South American mining company, with offices in New York, has issued a list of about fifty tools.

Manufacturers of planers have advanced prices from 15 to 20 per cent. Practically all types of machine tools are now back at war-time prices, while a few are even higher.

Crane business is fairly good, and prices show a tendency to advance in view of the difficulties in getting steel that may result from the steel strike. The Phelps-Dodge Corporation, New York, is inquiring for twelve cranes; the Kennedy-Van Soun Manufacturing and Engineering Co., New York, asks for quotations on seven, and the Cerro de Pasco Mining Co., New York, is in the market for five. An export company, the Transcontinental Merchants, Inc., New York, asks bids on 50 triplex chain hoists for shipment to Japan. The Standard Oil Co., of New Jersey, has bought twenty-eight jib cranes for its plant at Rahway, N.J.

## STEEL STRIKE NOT AS SERIOUS A MATTER AS AT FIRST ANTICIPATED

Special to CANADIAN MACHINERY.

PITTSBURGH, Pa., October 2.—The steel strike started out as a serious matter, but not altogether as serious as expected. For four days, or until Friday morning, September 26, the matter hung in the balance, whether the strike would spread or would recede. The information gathered together Friday morning showed positively that the strike was losing ground, proving conclusively that, barring accidents, it would be lost, and probably in a few weeks.

The character of the strike was determined the first day. The organization campaign, authorized at the annual convention of the American Federation of Labor at St. Paul, June, 1918, was under

the auspices of 24 unions affiliated with the federation, these unions being of various crafts which had more or less employment in the iron and steel industry as a whole, but did not represent any large proportion of the men employed. Machinists, engineers, moulders, etc., are employed to an extent and their joining the unions and going on strike would cripple operations more or less. The organization campaign also took in common labor.

When the strike started it was at once disclosed that it was not primarily a strike of these skilled men at all, but of the common labor, and chiefly the foreign born labor at that. The latter struck practically 100 per cent., while of

"Don't be an alibi artist. Get on the job," is the legend that is emblazoned on a signboard at the entrance to one of the big steel mills near Pittsburgh; and there are authentic reports to show that the honest-to-goodness American is getting on the job. "It is a case of America for the Americans with those fellows," said a steel man to CANADIAN MACHINERY. "What the majority of them cannot swallow is anything in the shape of dictation from so-called foreign agitators as to what they shall do. That has been a big factor in the present strike. The real American is from Missouri. Moreover, a good many workmen who own stock in steel concerns are getting a glimpse of the other fellow's side of the question. They realize that unreasonable labor unrest and agitation endanger their investment."

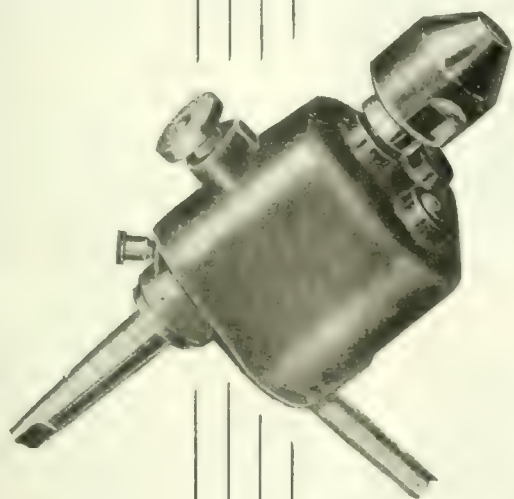
the American born common labor many were willing to work. Then two things occurred, making the influence of the strike more serious. Men who wanted to work were thrown out of employment because other men, needed for operating a plant or a department as a whole, were on strike, and men who were at work were intimidated by strikers and gotten out. For illustration, practically all of Youngstown was on strike by the end of the second day, but the Trumbull Steel Company, operating a steel mill and sheet and tin plate mill at Warren, a few miles distant, was in full operation. Strikers marched up the Mahoning valley to Warren and "got" the mill at the time of changing turns, the fresh turn not being allowed to go to work. The same thing occurred at Canton, the men from a striking plant marching to the Canton Sheet Steel Company plant, which was not on strike, and closing the mill.

By Tuesday night a low point in operations was reached. When the strike started, at 6 a.m. Monday, September 22, about 35 per cent. of the productive capacity of the iron and steel industry was thrown idle. Then a process began of the strike losing at places where it had started poorly, and of spreading where it had started well. By Tuesday night the idleness amounted to about 40 per cent. Then began a close watch of how things broke from hour to hour. As the Youngstown and Wheeling districts were down tight and the Monongahela Valley was working moderately well, while the rest of the Pittsburgh district was nearly normal, it was evident that if the Monongahela valley could continue operating the fact would break the strike in Youngstown and even Chicago and Gary, which were about two-thirds down, would eventually



# Taps Ten Times FASTER

Make your drill press do your tapping ten times faster than is possible by hand, by equipping it with



## *Aikenhead's* WALSTROM ATTACHMENT

The mechanically obtained OSCILLATING MOVEMENT closely resembles the action in hand tapping and cuts tap breakage to a minimum.

## 10 Days' Free Trial

For the benefit of shops that are unfamiliar with the great advantages of the Walstrom Attachment, we will ship one to any responsible firm on 10 days' free trial.

Should you at the end of this period not find it an invaluable asset to quick and economical production, return it and we'll promptly refund your money without question.

**AIKENHEAD HARDWARE COMPANY, LIMITED**  
17 TEMPERANCE STREET, TORONTO



feel the influence. Accordingly, the close watch was kept on the Monongahela valley. As it was chiefly a strike of common labor the blast furnaces were most affected, and the blast furnaces were also more vulnerable because the men have to work in the open. After Tuesday night the number of blast furnaces began to gain, but as there were losses elsewhere it was not a clear case, Chicago and Gary going down more and more, while the strike in Cleveland became practically complete. By Friday morning, however, as noted above, there was good news only and the swing was towards the strike waning. An important influence outside the Monongahela valley was that Tuesday and Wednesday there was a cleaning out of Bolsheviks at Sharon, in the Shenango valley, 70 miles north of Pittsburgh. Nearly a hundred were gathered in. Then the intimidation that had gotten out many men in the valley in addition to those who had struck, ceased, and beginning with the resumption of one Shenango merchant stack at Sharpsville Thursday night, operations in the valley increased, although very slowly. This is counted upon to have a favorable effect upon Youngstown and the rest of the Mahoning valley, just over the state line in Ohio, where everything is still closed.

It is largely a matter of protection by the civil authorities. In Pennsylvania nearly all the county and municipal authorities have done well to preserve order, and the magnificent Pennsylvania State Constabulary, a perfectly trained body of mounted men, has worked wonders. Two of these men can take care of a moderate sized riot. In Ohio there is no state constabulary.

The issue of a strike is usually settled the first week, though the strike itself may last much longer. With the start this strike made, it could have no hope of success unless it continued to gain throughout the first week, but it gained only during the first two days. Wednesday it was suffering more losses than gains, and since Wednesday it has had losses only, and no gains. Barring accidents, it is lost to the agitators and won by the manufacturers, and not by the latter doing anything except endeavoring to keep the agitators from doing mischief.

Winning a strike and producing steel, however, are different things for the manufacturers. The test, in this instance, has not been the amount of steel produced, but the number of men willing to work. Men have been kept in employment at works when the efficiency of the plant was more or less diminished by departments not being uniformly manned, and production has not been in the same proportion as employment. Thus, if as estimated there was 40 per cent. idleness when the strike was two days old, that does not mean that actual tonnage production was 60 per cent. of normal.

Furthermore, assuming that there are no accidents or unexpected developments and the manufacturers have virtually won the strike, it does not mean that

production will be fully restored in the near future. The strikers in some districts may hold out for weeks, perhaps many weeks, depending in considerable part how well order is preserved, for twenty per cent. of the men can often intimidate eighty per cent. of the men and keep them from working. At the best there will be a large loss of production and consumers of steel will be incommoded very considerably. There are stocks in buyers' hands, but the stocks are not large and are probably somewhat below normal. Buyers of steel products have displayed a fine feeling of sympathy for the steel producers and are indisposed to bother them about deliveries.

Of course, it is impossible to be absolutely precise as to the extent various producers are affected by the strike, but the following is a summary that cannot be far from the exact fact, dealing with conditions as they were at the end of last week: East of Johnstown, Pa., and Buffalo, N.Y., practically everything working. Cambria at Johnstown, closed

tight, also Lackawanna at Buffalo and some of the merchant furnaces at Buffalo. Cleveland, down tight; Lorain, nearby, running full. In the Pittsburgh district, Jones & Laughlin Steel Company operating both South Side and Woodlawn works practically full, the remainder of municipal Pittsburgh operating above 50 per cent. Monongahela valley, the largest single section of the Pittsburgh district, lower part including Homestead, Duquesne and Edgar Thomson works of Carnegie running nearly full; middle part of McKeesport, almost full; Monessen, at upper end, both steel plants closed. New Castle, at foot of Shenango valley, operating almost full; Farrell and Sharon, near middle, operating little, but increasing; upper part, almost idle, but gaining. Mahoning valley, including Youngstown, down tight. Wheeling district, down tight, except a few mills running practically full. Calumet district (Chicago and Gary) almost down. The south running almost normal.

## PIG IRON TRADE

The demand for pig iron thrives. Fear that deliveries may be away off on account of the strike is responsible for this.

**Philadelphia.**—Inquiries are coming for big tonnages. Some are from three to five thousand tons. In one other case the American Bridge Co. is reported to have asked prices and delivery on 25,000 tons.

**Boston.**—In the past week Boston dealers placed a tonnage of at least 14,000 for 1920 delivery. Largest buyers are makers of textile machinery.

**New York.**—It is hard to secure "right now" shipments of pig iron, and for this reason several big orders are now held up. Export business is poor, owing to exchange and shipping conditions.

**Pittsburgh.**—Prices of all grades of iron are more or less nominal at the moment, because there are no large sales going through to actually determine the values. Several merchant furnaces have been banked, due to the strike.

**Buffalo.**—Caution is the word in furnace circles here. Bookings for 1920 business are being discouraged.

**Chicago.**—Deliveries of iron are poor and a brisk demand exists for spot iron. Sellers having iron in transit have no trouble in cleaning out their stock.

**New York.**—The British Ministry of Shipping has handed over the former Hamburg American liner "Imperator" to the Cunard Steamship Company. The company have dry-docked the vessel and will refit her for their passenger trade between New York, Cherbourg and Southampton.

## U.S. SCRAP METAL

Scrap metal trade is much curtailed. Strike conditions are causing a holding-up of shipments.

**Chicago.**—Buying and shipping of iron and steel is almost at a standstill, owing to the strike. Dealers have been told to stop shipments in many cases. Many grades are 50 cents weaker.

**Boston.**—For the first time in months heavy melting is accumulating at some plants. Steel rails are \$1 down. The ordnance department are offering scrap steel.

**New York.**—Buying is pretty much on a hand to mouth basis, pending the outcome of the strike. The prices remain nominally the same.

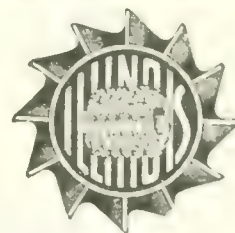
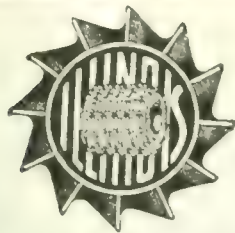
**Philadelphia.**—The strike has killed the market. Mills will not buy, as they fear that deliveries cannot be made to their mills, and dealers do not want to take the chance either.

**Pittsburgh.**—The halt has been put to business here. Prices are only nominal, and some of the mills are asking suspension of contract shipments.

**Look for Settlement.**—One hundred moulders, employees of the Canadian Ingersoll-Rand Co., The Sherbrooke Iron Works, the E. & T. Fairbanks Co., and other plants walked out, demanding a \$5 per day wage and other conditions. Some weeks ago the moulders made certain demands, chief among which was a nine-hour day with the same pay which they had been receiving for ten hours. This was granted by the employers, and the men went back to work. After this a meeting of the union was held and a strike vote taken. The officials of the companies stated that the walk-out would not tie up the production of the factories, and that they hoped for an early settlement.



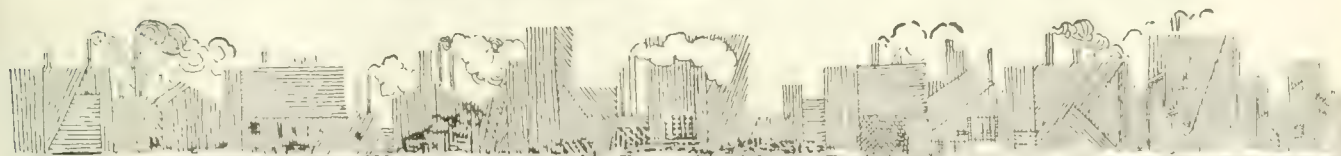
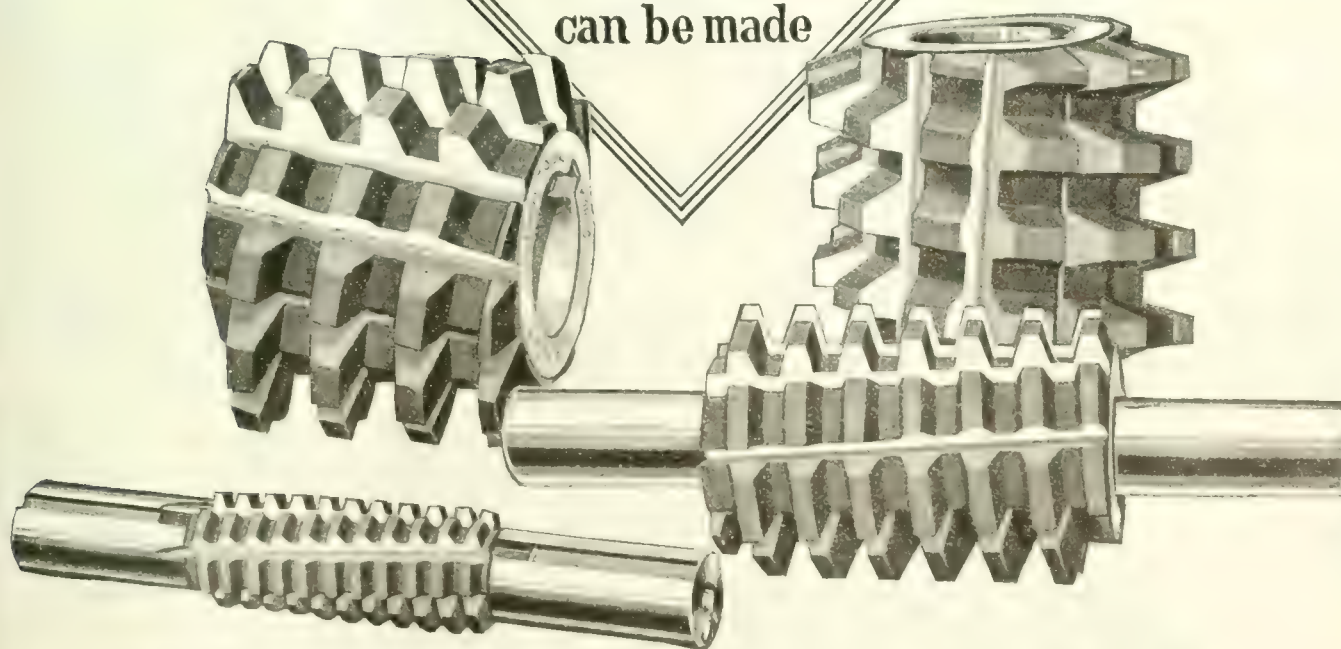
# ILLINOIS



## HOBBS

**INDIVIDUALIZED  
BY ACCURACY,  
DEPENDABILITY  
AND LONG LIFE**

**None better  
can be made**



## ILLINOIS TOOL WORKS, CHICAGO.

**Detroit Store**  
Woodward and Warren Aves.  
**A. C. Towne, Inc.**  
17 W. Swan St., Buffalo.

**New York Office**  
141-145 West 36th St.  
**S. J. Pfaff**  
Pioneer Bldg., St. Paul.

**Indianapolis Office**  
616 Fletcher Sav. & Trust Bldg.  
**Rose Tool and Supply Co.**  
111 Market St., Pittsburgh

**Louis G. Henes**  
75 Fremont St., San Francisco.  
Title Insurance Building,  
Los Angeles



# SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

## PIG IRON

Grey forge, Pittsburgh .....	\$27 15
Lake Superior, charcoal, Chicago .....	34 60
Standard low phos., Philadelphia .....	\$38 00-40 00
Bessemer, Pittsburgh .....	29 35
Basic, Valley furnace .....	25 75
Toronto price:—	
Silicon .225% to 2.75% .....	\$32.75 to \$35.75

## IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto .....	\$ 4 25
Steel bars, base, Toronto .....	4 25
Steel bars, 2 in. to 4 in. base .....	5 50
Steel bars, 4 in. and larger base .....	6 00
Iron bars, base, Montreal .....	3 75
Steel bars, base, Montreal .....	3 75
Reinforcing bars, base .....	4 50
Steel hoops .....	5 50
Norway iron .....	11 00
Tire steel .....	5 50
Spring steel .....	8 00
Brand steel, No. 10 gauge, base .....	4 40
Chequered floor plate, 3-16 in. ....	6 50
Chequered floor plate, ¼ in. ....	6 25
Staybolt iron .....	8 00
Bessemer rails, heavy, at mill. ....	
Steel bars, Pittsburgh .....	2 35
Tank plates, Pittsburgh .....	2 65
Structural shapes, Pittsburgh .....	2 45
Steel hoops, Pittsburgh .....	3 05
F.O.B., Toronto Warehouse	
Small sapes .....	4 25
F.O.B. Chicago Warehouse	
Steel bars .....	3 62
Structural shapes .....	3 72
Plates .....	3 90
Small shapes under 3" .....	3 62

## FREIGHT RATES

	Per 100 Pounds.	C.L.	L.C.L.
Pittsburgh to Following Points			
Montreal .....	33	45	
St. John, N.B. ....	41½	55	
Halifax .....	49	64½	
Toronto .....	27	39	
Guelph .....	27	39	
London .....	27	39	
Windsor .....	27	39	
Winnipeg .....	89½	135	

## METALS

	Gross.	
Lake copper .....	\$35 00	\$26 25
Electro copper .....	25 00	26 00
Castings, copper .....	25 00	25 00
Tin .....	59 00	58 00
Spelter .....	9 50	10 00
Lead .....	7 25	7 00
Antimony .....	9 75	10 50
Aluminum .....	33 00	35 00

Prices per 100 lbs.

## PLATES

	Montreal	Toronto
Plates, ½ up .....	\$ 4 50	\$ 4 50
Plates, 3-16 in. ....	4 90	4 90

Price List No. 38

## WROUGHT PIPES

### Standard Butt weld

¼ in. ....	\$ 6 00	\$ 8 00
¼ in. ....	4 68	6 81
¾ in. ....	4 68	6 81
½ in. ....	6 21	7 78
¾ in. ....	7 82	9 95
1 in. ....	11 56	14 71
1½ in. ....	15 64	19 90
2 in. ....	18 70	23 76
2½ in. ....	25 16	32 01
3 in. ....	40 37	51 19
3½ in. ....	52 79	66 94
4 in. ....	67 16	84 18

	79 57	99 74
4 in. ....		
Standard Lapweld		
2 in. ....	38 81	35 34
2½ in. ....	42 12	52 36
3 in. ....	55 08	68 47
3½ in. ....	69 00	86 94
4 in. ....	81 75	103 00
4½ in. ....	93	1 18
5 in. ....	1 08	1 37
6 in. ....	1 40	1 78
7 in. ....	1 83	2 32
8L in. ....	1 93	2 44
8 in. ....	2 22	2 81
9 in. ....	2 66	3 36
10L in. ....	2 46	3 12
10 in. ....	3 17	4 02

Terms 2% 30 days, approved credit.  
Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

## WROUGHT NIPPLES

4" and under, 60%.  
4½" and larger 50%.  
4" and under, running thread, 30%.  
Standard couplings, 4" and under, 40%,  
4½" and larger, 20%.

## OLD MATERIAL

### Dealers' Buying Prices.

	Per 100 Pounds.	Per Ton.
	Montreal	Toronto
Copper, light .....	\$15 00	\$13 75
Copper, crucible .....	18 00	18 00
Copper, heavy .....	18 00	18 00
Copper wire .....	18 00	18 00
No. 1 machine composition .....	16 50	16 75
New brass cuttings .....	13 00	10 75
Red brass cuttings .....	14 50	14 75
Yellow brass turnings .....	9 00	9 00
Light brass .....	7 50	7 00
Medium brass .....	9 00	7 75
Scrap zinc .....	6 00	6 00
Heavy lead .....	5 00	5 25
Tea lead .....	3 75	3 50
Aluminum .....	18 00	18 00
Heavy melting steel .....	13 50	13 50
Shell turnings .....	7 00	6 00
Boiler plate .....	13 50	11 00
Axles (wrought iron) .....	20 00	20 00
Rails .....	14 50	13 50
Malleable scrap .....	15 00	17 00
No. 1 machine cast iron .....	20 00	18 00
Pipe, wrought .....	10 00	5 00
Car wheels .....	20 00	20 00
Steel axles .....	20 00	20 00
Mach. shop turnings .....	6 00	6 00
Stove plate .....	15 00	13 00
Cast boring .....	7 00	8 00

## BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ½" and less .....	35
Carriage bolts, 7-16 and up .....	15
Coach and lag screws .....	50
Stove bolts .....	65
Wrought washers .....	50
Elevator bolts .....	25
Machine bolts, 7-16 and over .....	40
Machine bolts, ½" and less .....	40
Blank bolts .....	25
Bolt ends .....	25
Machine screws, fl. and rd. hd., steel .....	27½
Machine screws, o. and fl. hd., steel .....	10

Machine screws, fl. and rd. hd., brass .....	net
Machine screws, o. and fl. hd., brass .....	net
Nuts, square blank .....	\$0 75
Nuts, square, tapped .....	1 00
Nuts, hex., blank .....	1 00
Nuts, hex., tapped .....	1 25
Copper rivets and burrs, list less .....	15
Burrs only, list plus .....	25
Iron rivets and burrs .....	40 and 5
Boiler rivets, base ¾" and larger .....	\$8 50
Structural rivets, as above .....	8 40
Wood screws, O. & R., bright .....	75
Wood screws, flat, bright .....	77½
Wood screws, flat, brass .....	55
Wood screws, O. & R., brass .....	55½
Wood screws, flat, bronze .....	50
Wood screws, O. & R., bronze .....	47½

## MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws .....	50
Sq. and Hex. Head Cap Screws .....	45
Rd. and Fil. Head Cap Screws .....	20
Flat But. Hd. Cap Screws .....	10
Fin. and Semi-fin. nuts up to 1 in. ....	45
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in. ....	40
Fin. and Semi-fin. nuts over 1½ in., up to 2 in. ....	25
Studs .....	30
Taper pins .....	50
Coupling bolts .....	10
Planer head bolts, without fillet, list .....	10
Planer head bolts, with fillet, list plus 10 and .....	net
Planer head bolt nuts, same as finished nuts .....	
Planer bolt washers .....	net
Hollow set screws .....	net
Collar screws .....	list plus 20, 30
Thumb screws .....	40
Thumb nuts .....	75
Patch bolts .....	add 20
Cold pressed nuts to 1½ in. ....	add \$1 00
Cold pressed nuts over 1½ in. ....	add 2 00

## BILLETS

	Per gross ton
Bessemer billets .....	\$38 50
Open-hearth billets .....	38 50
O.H. sheet bars .....	42 00
Forging billets .....	51 00
Wire rods .....	52 00

Government prices.

F.O.B. Pittsburgh.

## NAILS AND SPIKES

Wire nails .....	\$4 70
Cut nails .....	4 75
Miscellaneous wire nails .....	.60%
Spikes, ¾ in. and larger .....	\$7 50
Spikes, ¼ and 5-16 in. ....	8 00

## ROPE AND PACKINGS

Drilling cables, Manila .....	0 39
Plumbers' oakum, per lb. ....	0 10
Packing, square braided .....	0 38
Packing, No. 1 Italian .....	0 44
Packing, No. 2 Italian .....	0 36
Pure Manila rope .....	0 37
British Manila rope .....	0 31
New Zealand hemp .....	0 31
Transmission rope, Manila .....	0 43
Cotton rope, ¼-lb. and up .....	0 74

## POLISHED DRILL ROD

Discount off list, Montreal and Toronto .....	net
---	-----



# *The Value of the Business Press to Business Men*

"Business men do not realize the value which trade journals and technical magazines may have for them in increasing the efficiency of their factories and in giving them a broad and comprehensive view of their business.

"Our foreign competitors read almost every article published upon their business with great care and thoroughness. Many of them have duplicate copies of their favorite trade paper sent to their homes so that they may read them away from the business without being disturbed. Many foreign manufacturers contribute articles to these journals on phases of the business with which they are most familiar. Such articles are bound to be helpful and have a constructive effect.

*"Our trade journals and technical papers are the best in the world, and they should be supported and encouraged by our business men.*

"Copies should be placed where employees can see them and they should be urged to read and study them.

"These papers are preaching the gospel of sound business on practical lines and are helpful not only to business but to the country as a whole.

*"If the suggestions made by them in the past had been followed by our business men it would not be necessary at this time to point out some of the fundamental weaknesses in American business."*

—Edward N. Hurley, formerly Chairman of the Federal Trade Commission, in "The Awakening of Business."

The following is list of the MacLean publications. Every publication is a leader in its field. Write us for any information you may desire with regard to the field covered, advertising rates, etc.

## TRADE NEWSPAPERS

Hardware and Metal  
Men's Wear Review

Canadian Grocer  
Bookseller and Stationer

Dry Goods Review  
Sanitary Engineer

## TECHNICAL PAPERS

Canadian Machinery  
Power House

Canadian Foundryman  
Printer and Publisher

Marine Engineering  
Can. Motor, Tractor and  
Implement Trade Journal

## MAGAZINES

MACLEAN'S MAGAZINE

FARMERS' MAGAZINE

Financial Post—Weekly Commercial Newspaper

# The MacLean Publishing Company, Limited

153 University Avenue, Toronto

Southam Bldg., 128 Bleury Street, Montreal

1207 Union Trust Bldg., Winnipeg, Man.



## MISCELLANEOUS

Solder, strictly	\$ 0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

## CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	50
Standard drills, all sizes	50
3-fluted drills, plus	10
Jobbers' and letter sizes	50
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	list plus 10
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus 10 to 40	
Canadian high speed cutters	net
American	plus 40

## COLD ROLLED SHAFTING

At mill	list plus 5%
At warehouse	list plus 25%
Discounts off new list.	Warehouse price at Montreal and Toronto

## IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

## SHEETS

	Montreal	Toronto
Sheets, black, No. 28	\$ 6 55	\$ 6 25
Sheets, black, No. 10	5 15	5 25
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright	8 50	8 00
Apollo brand, 10½ oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28		
Colborne Crown, No. 28		
Premier, No. 28 U.S.	7 75	
Premier, 10½ oz.	8 05	
Zinc sheets	20 00	20 00

## PROOF COIL CHAIN

(Warehouse Price)

B

¾ in., \$13.50; 5-16, \$11.50; ¾ in.,

\$10.50; 7-16 in., \$9.30; ½ in., \$10.15; \$13.00; ⅞ in., \$9.60; ¾ in., \$9.70; ⅝ in., \$9.95; 1 in., \$9.50; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

## ELECTRIC WELD COIL CHAIN B.B.

¾ in., \$16.75; 3-16 in., \$15.40; ¼ in., \$14.20; 5-16 in., \$11.50; ⅝ in., \$10.50; 7-16 in., \$9.30; ½ in., \$10.50; ⅞ in., \$10.00; ¾ in., \$9.70.

Prices per 100 lbs.

## FILES AND RASPS

	Per Cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot, Arcade	50

## BOILER TUBES.

Size.	Seamless	Lapwelded
1 in.	\$27 00	\$.....
1¼ in.	29 00	.....
1½ in.	29 50	26 00
1¾ in.	32 00	26 00
2 in.	31 00	26 00
2¼ in.	35 00	28 00
2½ in.	43 00	32 00
3 in.	48 00	40 00
3½ in.	41 00	41 00
3¾ in.	60 00	42 00
4 in.	75 00	56 00

Prices per 100 ft., Montreal and Toronto

## OILS AND COMPOUNDS.

Castor oil, per lb.	.....
Royalite, per gal., bulk	22½
Palacine	25½
Machine oil, per gal.	36
Black oil, per gal.	16
Cylinder oil, Capital	62
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	\$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

## BELTING—No 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

## TAPES

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

## PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

## ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.6

## BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod 0 34

Brass sheets, 24 gauge and heavier, base .....\$0 42  
Brass tubing, seamless .....0 46  
Copper tubing, seamless .....0 48

## WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

## Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

## Wool Packing

Arrow	25	Anvil	15
Axle	20	Anchor	11

## Washed Wipers

Select White	11	Dark colored	09
Mixed colored	10		

This list subject to trade discount for quantity.

## RUBBER BELTING

Standard ... 10% Best grades... 15%

## ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

## COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	\$42 50	\$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

## LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$10 25	\$11 50
Sheets, 3½ lbs. sq. ft.	10 00	11 00
Sheets, 4 to 6 lbs. sq. ft.	9 75	10 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

## PLATING CHEMICALS

Acid, boracic	\$ .25
Acid, hydrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulphuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy.	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulphate	.16
Nickel carbonate	.32
Nickel sulphate	.18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Zinc sulphate	.08

Prices per lb. unless otherwise stated

# WELLAND SECTION

## Small Town Advertised and Became a City

MANY cities in Canada can point with pride to phenomenal industrial growth. Once having started to expand, their development has continued, and assessment figures show constant annual increases, not only in property values, but in population as well. One of the most outstanding examples of the effects brought about by well-directed effort to secure industries, and through their agency, build up a strong industrial community, is demonstrated in the new city of Welland. This is the "baby city" of Ontario, and can well be termed the lustiest of all the youngsters of the municipalities. Welland was incorporated as a city on July 1, 1917, and is making prodigious strides to double the population for the next census. Geographically, Welland is particularly favored, and its unusual advantages, the greatest of which is cheap Hydro-Electric power, place this city in a class by itself. In addition to cheap power Welland possesses exceptional rail and water facilities, a combination that has helped materially in securing the large manufacturing plants for the city.

### Welland Enters Upon New Era

Welland's present importance as an industrial centre dates from 1906. This was the year of the coming of Hydro-Electric power. First came the Cataract Power Co. of DeCew Falls, to be followed later by the Ontario Power Co., and the Hydro-Electric Power Commission of Ontario. An American, B. J. McCormick, saw the wonderful possibilities that would follow the harnessing of Niagara power, and decided to devote his efforts to promote its interests in Welland. He became the first industrial commissioner, and to his energy and foresight must be credited the location of many of the largest factories in and around the city. In 1915 he was succeeded as indus-

trial commissioner by Louis Blake Duff, who looked after Welland's interests in this respect until 1918, and was followed by W. M. German, who holds this position to-day.

From 1907 to 1917 Welland continued to grow. Its population ten years ago was only about 2,000. To-day it contains 3,825 people, its increase running about ten per cent. per annum. In 1906 the assessment was slightly less than a million dollars. In 1917 it amounted to \$6,758,920. The industrial expansion has been equally striking. In 1906 the small sum of \$150,000 would have covered the total value of Welland's manufactured products, and ten years later, in 1916, they had expanded to \$19,375,115, and of this total only \$5,500,000 represented munitions. The industrial payroll was but \$50,000 for the entire year of 1906, and in 1916 it amounted to \$3,610,336. The number of workers had increased from 100 to 5,000 in these ten years.

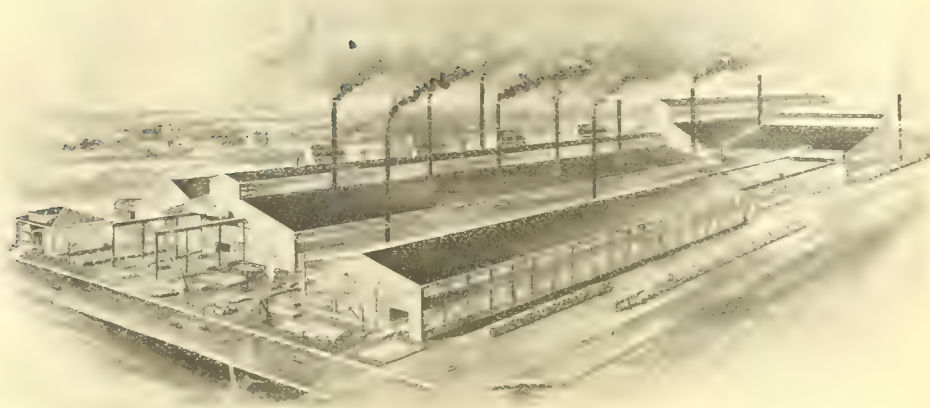
### Railway Facilities

The railway facilities of Welland are equalled by very few places in Canada. Lines radiate from it in all directions. The Grand Trunk railway from Bridgeburg to Detroit, over which pass, in addition, the trains of the Wabash railroad, the Michigan Central's line from Buffalo to Detroit, also used by the Pere Marquette; the Toronto, Hamilton and Buffalo railroad, direct from Welland to Hamilton and Toronto; and the Grand Trunk Railway's line from Port Colborne to St. Catharines, all pass through or close to the city. The Canadian Northern system also has access through the Niagara, St. Catharines and Toronto Railway, an electric line, paralleling the Welland Canal. The fact that there are so many lines competing for business renders the freight service particularly efficient.



PLANT OF M. BEATTY & SONS, LIMITED, WELLAND.





BILLINGS &amp; SPENCER PLANT OF CANADA FOUNDRIES &amp; FORGINGS

### The Welland Canal

The presence of this waterway gives Welland manufacturers the advantage of lake and rail rates. The present canal, though large enough when it was constructed, to admit of the passage of the biggest ships trading on the lakes, has long since become too small to accommodate the long upper lake freighters. To provide for their movement from Lake Erie to Lake Ontario, the new ship canal, now under construction, was designed. This new canal will have locks 800 feet long, 80 feet wide, and 30 feet water depth. There will be seven of these locks, all of the same dimensions.

### A Few of Welland's Industries

One of Welland's earliest industries is the plant of M. Beatty & Sons, which was established in 1850, and has since carried on business continuously. The principal output of the company is made up of dredges of the dipper, hydraulic and clamshell types, hoisting engines of all sorts and sizes, both steam and electrically driven, mine hoists, travelling derricks, etc. The firm has built many large dredges, and these dredges can be seen on work throughout the Dominion. At the moment seven large "Beatty" dipped dredges, one hydraulic dredge, several drill boats, and numerous steel scows are in operation on the various sections of the ship canal construction. During the war M. Beatty & Sons concentrated on shrapnel shells, being one of the first firms to undertake this work in Canada. They also made high explosives. After the need of munitions had passed the crucial point, the manufacture of auxiliary ship machinery was taken up, and this company filled large orders for windlasses, cargo winches, ash hoists and similar equipment for the Imperial Munitions Board, the Emergency Fleet Corporation, and other interests.

The Canadian Billings & Spencer Plant of the Canadian Foundries & Forgings, Ltd., was engaged extensively on munitions during the war. This company is now just as busy turning out forged tools, the well-known "Endurance" brand being made at the Welland factory. All the operations in the manufacture of their product are accomplished in this factory, from the making of the original castings to the finished article.

The Electric Steel & Metals Co., Ltd., was formed in 1913 for the manufacture of steel castings by the electric method. This company employed 278 hands on munitions during the war, and is now producing high-grade steel castings of every description for bridge, dock and

harbor construction. They have gone in extensively for welfare work on behalf of their employees, and provide many facilities for their comfort.

One of the newest industries is the Empire Cotton Mills, Ltd. They manufacture seamless bags, ducks, bag cloths, gray cotton fabrics and twine.

The metals - Chemical, Ltd., are engaged in the making of chemicals, and the Union Carbide Co. of Canada, have a large plant making acetylene and calcium carbide. The H. S. Peters Co., Ltd., are manufacturers of overalls and canned goods are put up by John Goodwillie & Sons. Chipman-Holton Knitting Co. of Hamilton have a branch

located in Welland, which produces hosiery. One of the plants of the Page-Hersey Iron & Lead Co., Ltd., is located here, which makes wrought, black and galvanized pipe.

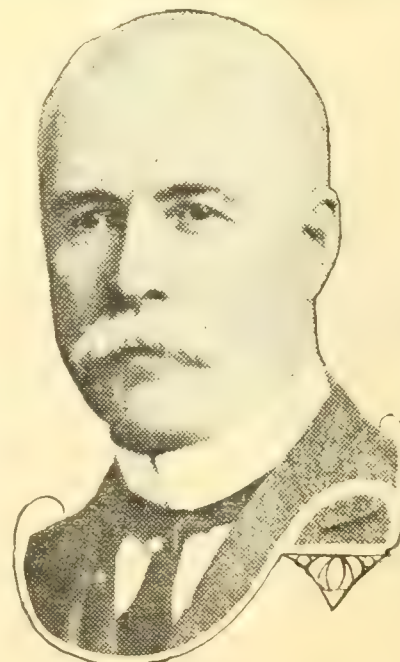
At the Electro-Metals, Ltd., ferro-silicon and electrodes are manufactured, while at the Volta Mfg. Co., the product is electric regulators, winches and magnetic brakes.

A complete list of the things made in Welland factories is quite large, and includes such imported articles as automobiles, agricultural machinery, brick, binder twine, boilers, coal stoves, cotton goods, canned fruit, cement blocks, contractors' machinery, dredges, derricks, electric trucks, engines, furnaces, gas ranges, hosiery, hoists, knitted goods, launches, overalls, rope, saws, sash and doors, scows, twine, underwear, etc.

The coming of factories has meant much more than a growth of urban population, with all its attendant advantages in the way of increased business for merchants and more work for builders and laborers. Its effect is noticed throughout the entire County of Welland. The roads have been improved and motorists find little to be desired. The city market is now large and active.

Much of the credit for Welland's industrial growth and prosperity can be traced to its publicity campaigns and it can be held up as an example to other communities to show what energy and up-to-date advertising can accomplish.

At this writing everything points to further expansion in the near future, as Welland is to get the first 100,000 h.p. from the Chippewa Development, and plans are now being made to inaugurate a big industrial campaign.

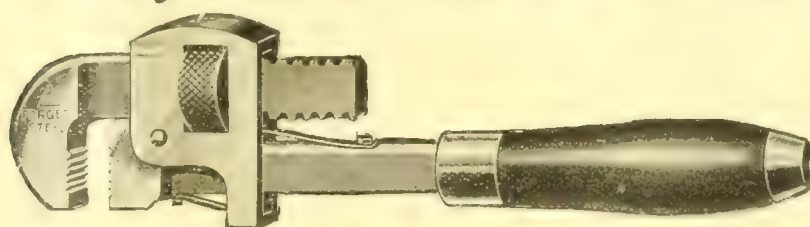
W. M. GERMAN, K.C.,  
Industrial Commissioner.

# CANADA FOUNDRIES & FORGINGS LIMITED

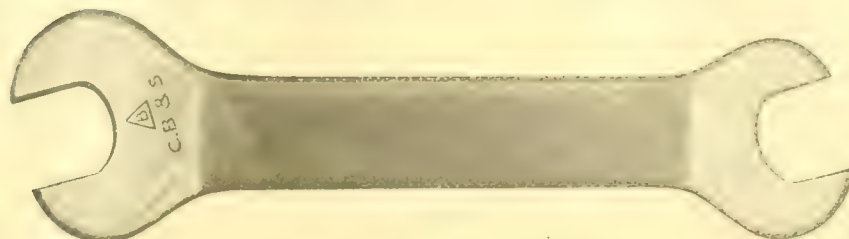
The World is full of "NUTS"



Every Nut Needs a Wrench



"ENDURANCE BRAND"



Never Wear Out

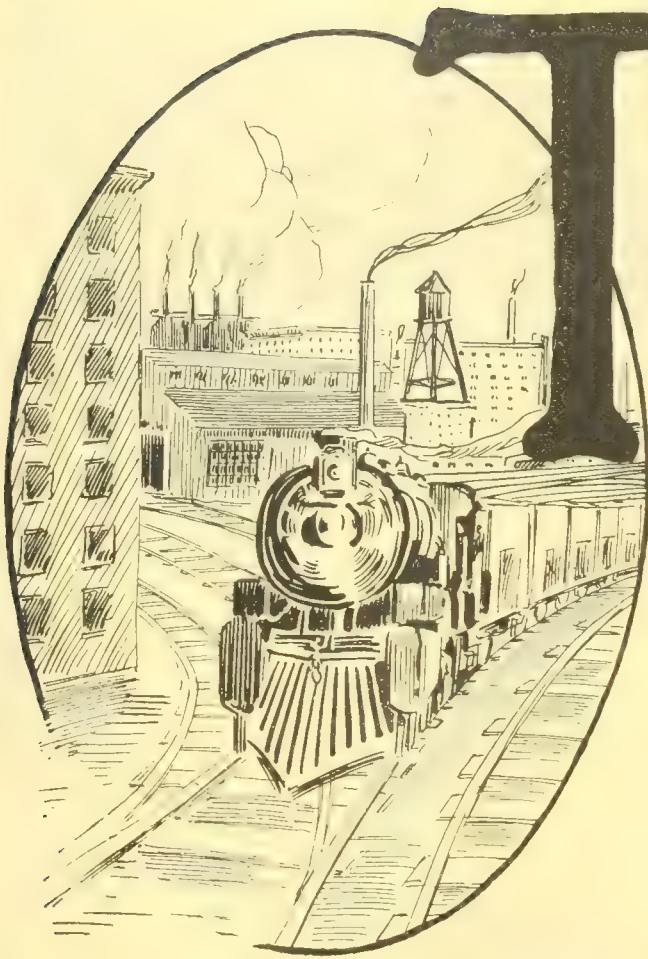


SEE YOUR JOBBER

Canadian Billings & Spencer Plant  
WELLAND, CANADA







# The City

## Railway and Water UNEQUALLED

**LAKE SHIPPING :** Welland is situated on the Welland Canal, the great marine highway, between tide water and the Canadian North-West, with daily freight service both ways.

**RAILROAD RATES :** Rates from Welland to the North-West and Pacific Coast, all rail, are the same as from all other manufacturing points in Eastern Canada lying between the Detroit River and Montreal. These rates are fixed by the Board of Railway Commissioners for Canada.

On account of the close proximity to the border, Welland is in the Buffalo switching group, and takes the Buffalo rates from the east and south, and enjoys quick delivery on all raw material imported from the United States.

The fact that all of these roads centre here creates competition, and is the biggest lever the manufacturers have for securing efficient service from the railroads. The seven railroads are as follows: Grand Trunk, Michigan Central, Toronto, Hamilton and Buffalo, Canadian Northern, Pere Marquette, Canadian Pacific, Wabash.

**W. M. GERMAN, K.C.**

*Industrial Commissioner*

WELLAND - - CANADA

# of Welland

## ter Transportation ALLED

### Electric Power at lowest cost

Every factory in Welland is driven by electric power supplied by the Ontario Power Company, of Niagara Falls, which is about twelve miles east of Welland, or from the Dominion Power Company of DeCew Falls, which is about twelve miles north of Welland. The fact that we have competitive companies operating in this district gives us competitive prices on power.

Excellent factory sites at low prices.

Labor conditions are eminently satisfactory.

**Liberal advantages and concessions granted by City Council.**

Prompt and Full Replies will be made to all inquiries.

**May we send Book of Information telling all about Welland?**

Personal Interview Solicited

**W. M. GERMAN, K.C.**

*Industrial Commissioner*

WELLAND - - CANADA

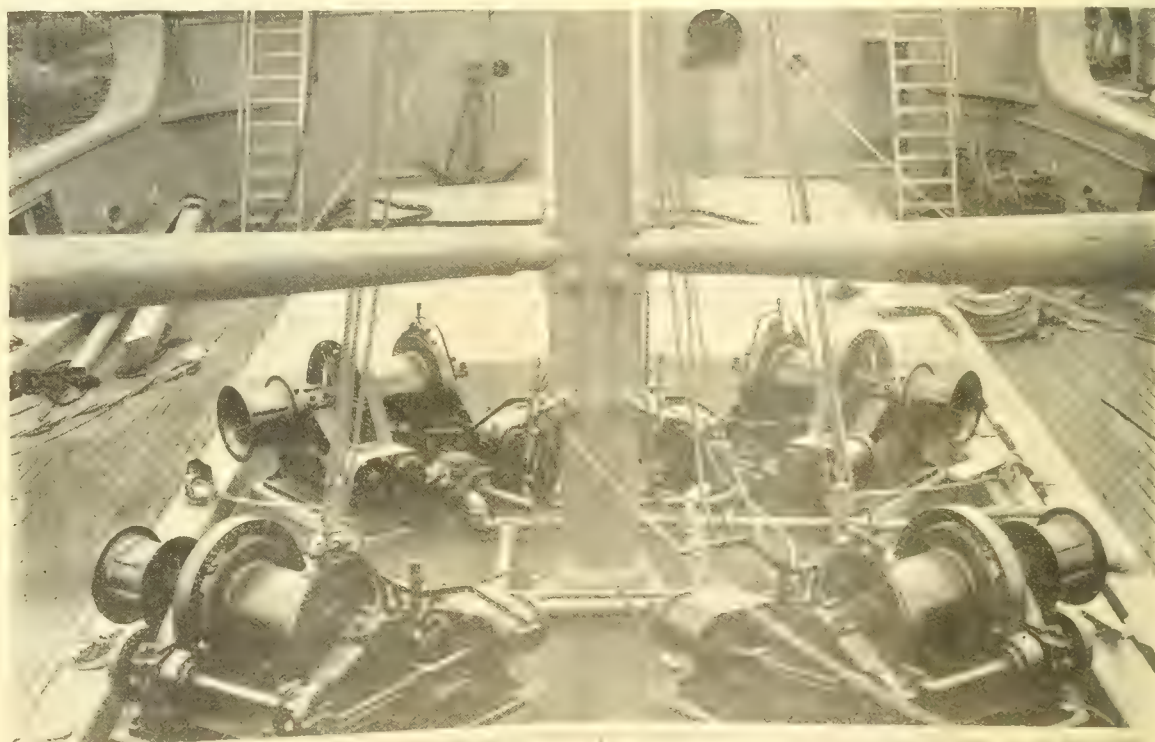




# "BEATTY"

Cargo Winches  
Hoisting Engines  
Clamshell Buckets  
Dipper Dredges  
Steel Derricks

Anchor Windlasses  
Electric Hoists  
Mine Hoists  
Hydraulic Dredges  
Derrick Irons, etc.



8'4" x 8' cargo winches arranged on deck of 1,500-ton ship

This view shows one of the ships built by Wm. Lyall Ship building Co. We also supplied the Northern Construction Co., the Davie Shipbuilding Co., the Pacific Construction Co., the National Shipbuilding Corp., the New Westminster Eng. Co., and others with this same type of winch. All types and sizes built to jigs.

Equipment of this kind is our specialty. Let us have your inquiries. Our facilities for quantity production enables us to interest you.

Agents { H. E. Plant, Montreal  
E. Leonard & Son, St. John  
H. Turnbull & Co., Toronto  
Kelly-Powell, Ltd., Winnipeg  
R. Hamilton & Co., Vancouver

**M. BEATTY & SONS Limited**  
**WELLAND**  
**CANADA**

# Electric Furnaces and Equipment

---

THURY REGULATORS, NEW TYPE

ELECTRODE WINCHES

ELECTRODE HOLDERS

MAGNETIC BREAKS

ROOF COOLER RINGS

HAND CONTROLS

BUSS BARS SYSTEMS

ELECTRIC FURNACES

FOR SMELTING FERRO ALLOYS AND REFINING STEEL

PORTABLE ELECTRIC HOISTS,

MONO RAIL HOISTS,

GENERAL CONSULTING

---

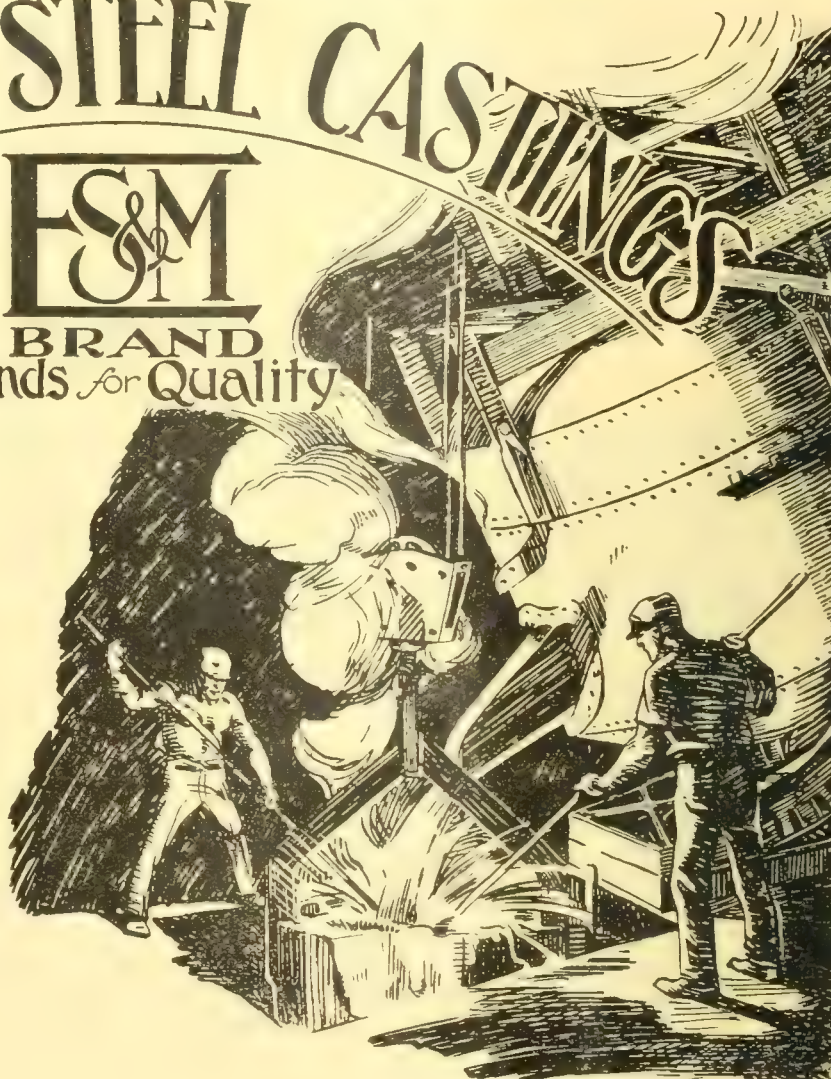
**VOLTA MANUFACTURING CO.**  
**WELLAND, ONTARIO**



**WELLAND SECTION****ELECTRIC STEEL CASTINGS**

**ES&M**  
**BRAND**  
*Stands for Quality*

**H**IGH Grade Steel  
 Castings of every  
 description. Put our  
 quality and service to  
 the test and you'll be  
 convinced that we  
 offer the best.



**Machinery Steel Castings**  
**Bridge, Dock and Harbor Construction**  
**Manganese Steel**

Wearing parts for Gyratory Crushers, Dredger  
 Pins and Bushes, etc., etc.

All Alloy Steel Castings.

Write for prices and particulars.

**The Electric Steel & Metals Company, Limited**  
**WELLAND, ONTARIO**



# MALLEABLE AND CAST IRON PIPE FITTINGS



## The Brand That Has The Quality

"Quality" and "Reliability" are two essentials demanded of *Cast Iron* and *Malleable Fittings*, by all sanitary and heating engineers.

Time and money are lost by improperly made fittings. All our cast iron and malleable fittings are properly recessed and every fitting bears the above trade-mark of quality.

We make a complete and full line of both flanged and threaded fittings from  $\frac{1}{8}$ -inch up, and can make deliveries from stock, both standard and extra heavy.

When ordering from your jobber be sure you buy—"the brand that has the quality." They are different. A trial order will convince.

**International**  
**Malleable Iron Company, Limited**  
Guelph, Ontario, Canada



# Canadian Trade and United States Steel Strike

**H**OW will the steel strike hit Canadian firms? It may be a little early yet to secure an intelligent answer to such a question. Some firms can go along indefinitely. Others can not. In some cases the effect will be felt very shortly.

Goold, Shapley & Muir, Brantford, make gas engines, tractors, windmills, tanks and towers, etc. They state:

"In our opinion, if the strike amongst the steel workers in the United States is at all prolonged, it will have a most serious effect upon industries using this class of material in Canada, as it will undoubtedly force many industries to shut down until supplies can be secured.

Unfortunately our Canadian steel industries are not yet sufficiently developed to secure all the product necessary in our own country, and in any case they would be so severely taxed that it would not be possible to supply the demand.

We sincerely hope that this matter may be adjusted at a very early date, as we look forward to serious consequences to the workers of Canada if Canadian manufacturers are compelled to close their works through a lack of supply of necessary material."

C. H. Waterous, of the Waterous Engine Works Co., Brantford: No doubt if the steel strike conditions for any length of time, and the production of steel is thereby decreased (which probably will be the case), it will have the effect of reducing the quantity of this material, and this will have a bad effect on Canadian business. Quite a number of sources of supply that were available before the war started are not now in a position to furnish material, which adds to the possibility of shortage."

Alex. R. Goldie, of the Goldie & McCulloch Co., Limited, Galt: "It is, of course, impossible as yet to foretell the result of this strike, as I do not know what stocks the steel companies in the States have been carrying, but, undoubtedly, if the strike continues for any length of time it will very seriously interfere with our business as a great part of the steel that we get from the United States cannot at present be obtained elsewhere. We have at present a good stock of steel material, so that we are not interfered with as yet, but certainly will be if the strike continues."

One of the largest makers of machine tools in the Dominion says: "We would advise that our purchases of hot rolled steel in the States are limited to small tonnage of hot rolled bars, 4 in. and larger, but, as we have ample stocks of these sizes on hand for some time, we do not think it will seriously interfere with our work. As we are large users of cold drawn steel, it may affect us, as we understand a great amount of steel

drawn in this country is done from American bars."

E. Leonard & Sons, Limited, London, Ont., manufacturers of engines and boilers, state: "We have material on hand (or in transit) sufficient to cover the majority of orders now on our books. We also have a small stock of standard boiler plates, tubes, etc., with which we think we can take care of any orders that may come in for standard articles during the next month or six weeks. Orders for special boilers requiring special material would be delayed through the present strike."

Wm. Inglis, president of the John Inglis Company, Limited, Toronto, engineers and boiler makers: "I do not believe that this strike will amount to anything as far as Canadian business is concerned, as I understand the steel companies are taking care of all the business for this country under present conditions, as the mills that are affected do not make material that we import."

The Hamilton Bridge Works Company, Limited: "If the strike continues indefinitely and extends further, it is only a matter of time before firms in similar lines to ourselves will be unable to operate, for the reason that a large percentage of our materials, such as plates and structurals, come from the United States. At the present time only a small range of angles are manufactured in this country, and, therefore, our requirements cannot be obtained in Canada, and obtaining supplies from Britain and the Continent is out of the question at the present time. The Algoma Steel Corporation, Ltd., of Sault Ste. Marie, expect to be in a position in a few weeks to be rolling beams and channels up to 15 in. and angles up to 6 in. x 6 in., and as soon as this program is carried out some relief will be obtained."

Inquiry at the Dominion Shipbuilding Yards, Toronto, brought out the information that they have enough plate in stock to finish the two ships at present laid down. This will carry them through the winter, so they will not be affected, unless the strike extends over six months. Apart from the actual supply of material, the Dominion yards report they have plenty of labor, but the Port Arthur yards are having difficulty in getting men. Mr. Miller of the Port Arthur Shipbuilding Co. was in town a few days ago looking for riveters.

A despatch from St. Catharines says: The shortage of tin plate, caused by the steel strike in the United States, is causing a great deal of inconvenience among the canners and growers throughout the whole province. This district is especially hard hit, a few canneries being compelled to shut down owing to their stock of cans having become ex-

hausted. The plants of the Dominion Canners at Welland and Niagara-on-the-Lake are closed, and the plant at Jordan Station will have to close.

The Schenck plant, in this city, has a sufficient supply for to-day, while the Simcoe plant has by far the best supply, and will be able to keep in operation for a few days to come.

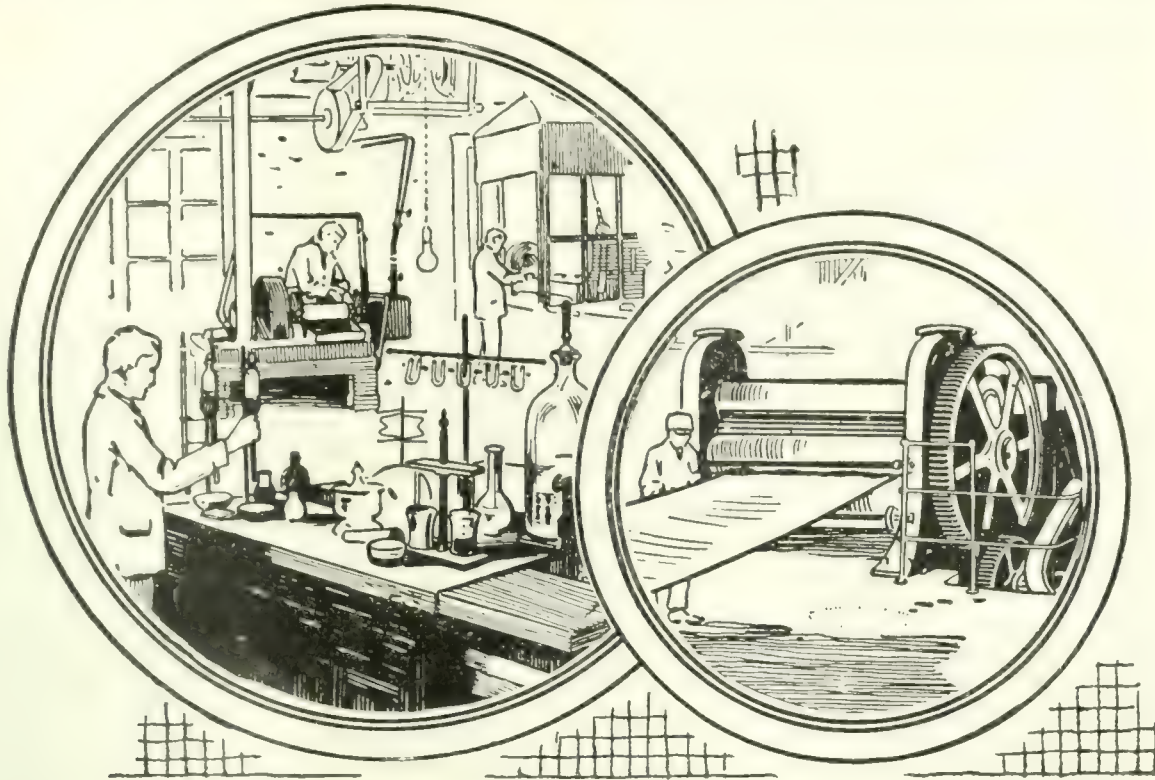
## The Position in Montreal

**M**ONTREAL, Que., Oct. 2.—The Steel Company of Canada continue to operate on a fair volume of business which may have shown a slight increase during the past week, which condition may have developed as a result of the steel situation in the States. Officials of the Steel Company state that it is largely heavy products, such as steel plates and shapes, that will be affected by the strike, and as the business in this direction is comparatively light at present, and a conservative policy is practised by builder and manufacturer, the Canadian situation will not feel the brunt of the strike in the States. Asked as to whether there was any danger of the strike spreading to this country, the official did not think so, and was under the impression that the strike among the American steel mills would be nearer a settlement by the end of the week. This appears to be the general opinion among steel men here.

The purchasing department of the Canadian Pacific Railway advises that the present requirements for steel supplies are such that the strike in the States has had little effect so far. In anticipation of a strike some time ago, they took care to obtain sufficient material to carry them over a reasonable period of idleness at the mills. In addition to this, their present steel requirements are not excessive, and unless the situation takes a more serious turn, they expect they will be able to carry on without being seriously hit by conditions in the steel districts.

Officials of the Montreal Locomotive Works report no serious effect as a result of the strike in the States. As a matter of fact, the plant here is operating much below normal, and their present requirements are not sufficient to feel the pressure of restricted supplies. They are optimistic regarding the strike and believe that a settlement will be reached within a short time. They state, however, that a long strike would materially upset the plans of Canadian manufacturers, as American conditions would naturally be reflected here, in which case the curtailed production of steel would be experienced all along the line. Considerable stock is now on hand, and with the small business booked, will be sufficient to carry them along for some time.





## The Quality Standard That Produces "Plus Service" Belting

The only sure way to get satisfactory service is to buy products of known worth.

In Dominion Rubber System Belting, the worth is known because every ounce of material—each individual operation and each finished belt must test up to the highest quality standard ever made for belting.

From the time the materials come into our factory until the belt is running on your pulleys, there is no chance of your getting anything but "plus service" belting.

This is the result of over fifty years of belt making experience and research by the oldest, largest and most completely equipped rubber organization in Canada.

The rubber that goes into Dominion Friction Surfacing Belting is not a mere waterproofing substance—our chemists have given it a far greater value by making it into a friction compound that prevents practically all power waste on the pulleys.

"Plus service" includes the free technical advice of our belting engineers who are ready to help you with your transmission and conveying problems without placing you under obligation to us.

A phone call, wire or letter to our nearest branch places all of our facilities at your disposal.



### Service Branches:

Halifax,	Toronto,	Fort William,	Edmonton,
St. John,	Hamilton,	Winnipeg,	Calgary,
Quebec,	London,	Brandon,	Lethbridge,
Montreal,	Kitchener,	Regina,	Vancouver,
Ottawa,	North Bay,	Saskatoon,	Victoria.



## MONTREAL NOTES

Sometime ago it was announced that Paul Mercier, chief engineer of the city of Montreal, was resigning from the position. It is now learned that he will not be entirely dissociated from the affairs of the city, as he has been retained in the employ of the ratepayers as a consulting engineer. His time, however, will only be partly occupied in this connection, as he will join the staff of the Ecole Polytechnique as an instructor and lecturer.

\* \* \*

On the recommendation of the chief of the fire department the Administrative Commission of the city of Montreal have under consideration the revision of the regulations regarding the installation of dry sprinkler systems in big office buildings and industrial plants, so that hose connections from the outside could be utilized when conditions prevent the access to the interior. A revised by-law is now before the council for their approval and ratification.

\* \* \*

The shipbuilding plant of the Canadian Vickers Limited was the scene of a serious accident last week, when one man was so badly injured that he died shortly after, and fourteen or more were so seriously hurt that they required medical attendance either at the plant or at the hospital. It is supposed that an acetylene tank had been placed too close to an open fire and that the tank had become overheated, resulting in the explosion. The effect of the explosion was to wreck the walls of the adjoining building and break almost all of the glass in the side and the roof in which the accident took place.

\* \* \*

Should the railway strike in England continue for any length of time there is the probability that the shipping activities will be seriously interfered with, as the inability to remove the goods from the respective wharfs will cause a congestion that can have only one result, the practical embargo of imports and exports of anything but the most essential products. This condition has not yet been felt here, but it is not unlikely that some action will be taken within the week. Prior notification to this effect has already been issued by the British embassy at Washington, and a confirmation of this order is almost imminent.

\* \* \*

During the recent stay of the C. P. O. S. liner Corsican in the port of Montreal, a test was made of a new apparatus designed to facilitate the lowering of lifeboats from a vessel at sea. The device is a simple attachment of skids placed over the ordinary lifeboat, and it was shown that, no matter what angle the ship may be listed at, the presence of these skids permits the lowering of these boats with perfect ease and safety. This appliance was designed by Mr. Hylands, of New York, and has already been adopted by the United States Navy and the U. S. Shipping Board, and the recent demonstra-

tion at Montreal was effected with a view of introducing the invention in Canada.

\*

For many months the Dominion Bridge Company have been actively engaged in the making of machinery for the paper industry. While in some respects the initial work was more or less in the nature of experiments, the rapid growth and the future needs of this great Canadian industry has practically decided the officials of this company to manufacture this line of equipment as part of their post-war developments. The bulk of the machinery now used in the pulp and paper mills has been imported from other countries, but the enterprise of this firm will enable them to supply Canadian-made products for Canadian production. It is believed that contracts have already been made with some of the provincial mills.

\* \* \*

Members of the Kiwanis Club recently paid a visit to the Angus shops of the C. P. R., and had the opportunity of viewing the activities that are going on at these works. They were royally entertained by the officials of the company, lunch being served in the dining room at the plant. It might be mentioned that some of their past activities have been the production of 77 large locomotives in a year, in addition to about 338 passenger and 6,530 freight cars. At present the shops are engaged in heavy repairs to 50 locomotives and are also turning out four new ones a month. They are also repairing about 100 freight cars and eight passenger coaches per day. Among the new productions are refrigerator and flat cars, as well as a new type of all-steel tourist coaches, of which thirty are being made.

\* \* \*

Some comment has been made by manufacturers here on the report from England, that Canadian manufacturers are taking orders that they cannot fill, or cancelling the same after they have once been accepted. It is stated that in many cases Canadian manufacturers here are unable to take care of the business that is offered, but the real fault lies with the brokers and commission agents, who are too ready to accept export business before ascertaining whether the goods or articles can be supplied. It is generally contended that strikes and industrial disturbances have prevented anything like capacity production, a condition that is seldom attained in reorganization or reconstruction periods. Large quantities of manufactured goods, for variety requirements, are being demanded by foreign countries, but combination of circumstances prevent the handling of these goods.

\* \* \*

On Saturday of last week the cargo steamer "Alsace" was successfully launched from the yard of the Canadian Vickers Limited. The vessel was first consecrated by the French clergy here, and the ribbon was then cut by Madame Begard, wife of Capt. L. Begard, the representative of Cie Francaise d'Armement d'Importation de Nitrate de

Soude, of Paris, France, for which company the vessel was built. The S. S. Alsace is a single screw steamer of approximately 8,400 tons and will have a speed of about 11 knots. She is 400 feet long, 52 feet beam and with a depth of 31 feet. She is especially designed for the nitrate trade from Chili to France, and is fully up to the requirements of the French Board of Trade and Lloyds 100-AE classification. It is expected that the vessel will be completed and ready for loading in the course of three or four weeks.

## ST. JOHN, N.B., NOTES

ST. JOHN.—Damage to the extent of some \$25,000 was done this week in the destruction by fire of two warehouses owned by the Wallace Machinery Works, at Sussex, N.B. Some material in the warehouses was destroyed, including eight threshing machines, wood-cutters, and some valuable patterns. The loss was partly insured.

\* \* \*

A new pork-packing plant is to be established at Moncton, N.B., by two St. John men, Walter Jones and Wm. Davis, under the firm name of Jones and Davis. They have purchased land and begun construction of the plant which will have a front of 50 feet, and in which modern machinery will be installed.

\* \* \*

H. J. Ramshaw, of Hamilton, Ont., manager of the Garlock Packing Co., was in St. John this week and established a branch of the company here. They will carry a stock of engines and other apparatus for industrial plants. The branch will serve as a distributing centre for the maritime provinces.

\* \* \*

Capt. William Burrill has returned home after a lengthy period of service overseas. He left here in June, 1915, as paymaster with the 26th Battalion, and went to France with it that year. With the exception of a brief visit home for a few days last spring he has since been overseas. He was formerly with the Canadian Fairbanks-Morse, Ltd., in St. John.

\* \* \*

Plans for the supplying of power from the Nepisiquit River will come before the Provincial Government at its meeting in Fredericton, N.B., next week. The power is for the Bathurst Lumber Co., to supply their pulp mills, and will be an important factor if the Government approves of the scheme.

\* \* \*

Work was begun this week on the construction of a new brick addition to the buildings of John Palmer, Ltd., at Fredericton, N.B. The work will give an additional floor space of 15,000 feet for the oil tanning footwear department. The construction work is in charge of John C. Smith and the contract represents approximately \$25,000. It will be quite an addition to this manufacturing concern's plant.



## PERSONALS

James R. McNeil, who recently resigned his position as manager of No. 11 colliery of the Dominion Coal Co., to assume charge of the Florence mine, of the Nova Scotia Steel and Coal Co., at New Glasgow, has entered upon his new duties. Mr. McNeil's engagement by the Scotia Co. follows closely upon the appointment of Mr. A. S. McNeil as superintendent of mines of the Nova Scotia Steel & Coal Co., and D. H. McLean as manager of their Princess mines, both of whom severed their connection with the Dominion Coal Co. to take up new responsibilities with the Co. on the north side of the harbor. The Florence, or No. 3 mine, is Scotia's largest producer with a daily output of between 800 and 900 tons.

## TENDERS

Tenders will be received up till October 6, 1919, for the construction of a grain conveyor in St. John Harbor, N.B. Plans and specifications can be obtained at the Department of Public Works, Ottawa, or at the offices of the District Engineers, Shaughnessy Building, Montreal, and Equity Building, Toronto, also the engineer in charge, St. John, N.B.

## TRADE GOSSIP

**Equipment Wanted.**—C. P. Wilson Co., 509 Lumsden Building, Toronto, are in the market for a travelling crane; also a locomotive crane, both of ten-ton capacity.

**Wants Machinery.**—G. W. Allan, of Allan & McKelvie, Engineering Co., Ltd., Vancouver, has been in the east on his way to the Philadelphia convention. He is in the market for an open-sided planer and a miller. His firm is going in for saw-mill machinery.

**Leaside Shops Busy.**—There are a good number of locomotives and coaches being overhauled at the Leaside shops of the C. N. R. More men are being taken on from day to day, and it will soon be necessary to add another coach to the work train which runs daily from North Toronto.

**Busy Ingersoll.**—Mayor Buchanan, Ingersoll, Ont., reports that all industries there, including two new ones added during the year, are in a thriving condition. The town has available for immediate use a building of 25,000 feet floor space, suitable for manufacturing purposes. Its location is most favorable, standing as it does between the two lines of railway serving the town.

**Error in Classification.**—Owing to an error in classification, the Volta Manufacturing Co., of Welland, has not been fully listed in our Buyers' Directory. The name now appears under the following headings: Electric furnaces, drum controls, electric furnace regulators, winches, roof coolers, and electrode holders, electric hoists, stationary and mono-

## "Star Brand" Seamless Brass and Copper Tubes

Including  
*Iron Pipe Sizes*

also

**Seamless Brass  
Condenser Tubes**  
*Ready for Immediate  
Shipment*

from our

NEW YORK WAREHOUSE

Also a complete line of Mechanical Cold Drawn  
Seamless Steel Tubing

**U. T. HUNGERFORD  
BRASS & COPPER CO.**

Lafayette, White & Franklin Sts.  
NEW YORK, U.S.A.

rail, cranes, overhead (hand and electric), current transformers.

**Increase Capital.**—The Lufkin Rule Co. are increasing their capital from \$100,000 to \$150,000 by adding 5,000 shares of \$10 each.

**Plant Extending.**—The latest branch of industry to announce an extension is the Brantford Oven & Rack Co., which will double its plant here owing to increased demands for its output. Almost every factory in the city has either extended this year or is working on plans for such extension, and the boom is not inflated, as never were building costs so great. It is expected that within a few days another important announcement will be made along industrial lines.

**Machine Tools, Etc.**—The import department of a firm with head office in Calcutta and branches in New York and London, desires to secure representation in India for Canadian manufacturers. They are interested chiefly in machine tools, mill and factory equipment, marine and stationary engines, electrical apparatus, motor cars and equipment. Their organization is exceptionally strong. References, particulars by addressing Trade and Commerce Dept., Ottawa, and referring to No. 2767.

**Canadian Steel Corporation.**—Although actual construction has been held back rather than rushed, the work on the plant of the Canadian Steel Corporation at Ojibway has been going on slowly. One foundation for a 600-ton furnace is now in and work started on a second. Speaking of costs, one of the Steel Corporation men told CANADIAN MACHINERY that the foundation of a 600-ton blast furnace now cost as much as a complete 250-ton stack in pre-war days. Although no definite plans are yet announced, it is known that the Canadian Steel Corporation have big plans under way for the Ojibway plant.



## PATENT ATTORNEYS

### RESEARCH BUREAU

REPORTS BY EXPERTS ON SCIENTIFIC, TECHNICAL AND INDUSTRIAL DEVELOPMENT.

SPECIAL RESEARCHES ARRANGED.

PATENTS, TRADE MARKS, ETC.

HANBURY A. BUDDEN

CABLE ADDRESS

712 DRUMMOND BLDG., MONTREAL

"BREVET"



Fetherstonhaugh & Co.,

The old established firm. Patents everywhere. Head office, Royal Bank Bldg., Toronto. Ottawa office, 5 Elgin St. Offices throughout Canada. Booklet Free.



In all countries. Ask for our Investor's Advice, which will be sent free.

MARION & MARION 364 University St.

Merchants Bank Building, corner St. Catherine St., MONTREAL, Phone UP. 6471 and Washington, D.C., U.S.A.

### For Sale or License



The Patent on a new and improved REVERSIBLE GENERAL PURPOSE INTERNAL COMBUSTION ENGINE, inexpensive to build and

most economical to use. Patented Canada, Jan. 16, 1916, No. 157,188. Patented in England, Sept. 11, 1912, No. 20,762. Address W. T. Smith, 636 Arlington Ave., Lockland, Cincinnati, Ohio, U.S.A.



SAYS THE MASTER MECHANIC The Greb Automatic Grip Puller is a One-Man Puller—Quick-acting, strong and simple in the extreme. May be locked in any desired position. A combination of two or three arms. Heavy Duty Size capacity 1" to 18". Junior size capacity 1/2" to 7". Two sets of jaws furnished with each size.

TEN DAYS' TRIAL—If your dealer or jobber does not have them we will send you one. Try it ten days. If not satisfactory, return to us and we will refund your money. We also make the GREB RIM TOOL.

THE GREB CO., 318 State St., BOSTON

**Canadian Goods for New Zealand.**—The Canadian Trade Commissioner for New Zealand addressing a meeting of the Chamber of Commerce at London, Ont., advised them to develop the export trade. The people of New Zealand were anxious to buy Canadian goods, and were even to pay a little higher price for articles that were imported from Germany previous to the war.

**Bonus for Workmen.**—The employees



TRADE MARK

**"HAWK" BRAND STEEL**



REGISTERED U.S. PAT. OFFICE N.Y. 50,717, 51,151  
CANADIAN PAT. OFFICE N.Y. 33

**"HAWK  
VANADIUM"  
TOOL STEEL**

*Remarkable in its glass  
Hardness, Toughness and  
Cutting Efficiency.*

Will give twice the cut  
of a regular tool steel  
at one grinding.

Order "Hawk Vanadium"  
for your End Mills  
and cutters. Once  
known—always used.

**Large Stock. Prompt  
Shipment.**

Write for full particu-  
lars to

**Hawkrige Brothers  
Company**

Main Office and Warehouse:  
303 Congress Street, Boston, Mass.  
Storehouses Malden Mass.

**STEEL**  
OF EVERY DESCRIPTION  
SEND US YOUR ENQUIRIES.

THE  
**"FLU"**  
Stayed out  
of this  
PLANT



PURO SANITARY DRINKING FOUNTAIN CO.  
HAYDENVILLE, MA.


**PURO COOLER**

**PURO** SANITARY  
DRINKING  
FOUNTAIN

(MADE IN CANADA)

The only fountain with a bowl that prevents lip touching the bubbler head. Its moderate cost over and over in all the well ordered plants whose present and past success has been due to the Puro Sanitary Drinking Fountain. Puro saves lives, time and money. Write

**Puro Sanitary Drinking Fountain Co.**  
Canadian Agents  
**McKENZIE BROS.**  
18 St. Alexis St., Montreal, P.Q.



merce Department, Ottawa, and refer to 15 R. S.—Steel and iron products, machinery, etc.—A returned soldier who spent four years with the Canadian army in France, having technical and practical knowledge of the production and distribution of steel and iron products, machinery, etc., possessing a board commercial and business training, and extensively traveled, would like to get in touch with manufacturers or others who are desirous of establishing or increasing European trade. Before the war he held the position of sales manager for an important firm dealing in iron and steel products.

**Plant Changes Hands.**—The plant of the Canadian Aeroplane Ltd., on Dufferin street, north of Lappin avenue, has been sold by the Imperial Munitions Board to the Columbia Graphophone Company for \$600,000. With the single exception of the Massey-Harris works this is the largest plant under one roof in Toronto. It was used for the building of aeroplanes during the war. The building is two storeys high, of concrete and brick construction and contains over 250,000 square feet of floor space, while the site contains a little over 10 acres. The frontage on Dufferin begins a few yards north of the corner of Lappin and Dufferin on the west side and runs north 333 feet, while the depth of the site is exactly a quarter of a mile.

**New Steel Cars.**—The first of approximately 100 new steel passenger cars was delivered to the Canadian National Railways, and it is confidently expected that the entire order, comprising six classes of cars, will be completed by the end of January, 1920. It has been thought that the Canadian builders might have been tampered by the convulsion in labor in the steel trade in the United States, but Mr. George E. Smart, General Master Car Builder of the C.N.R., who has been to the affected centres investigating, reports to-day that the steel for the "National" cars was shipped just prior to the outbreak of trouble at the great steel plants. The new steel passenger equipment under order for the C.N.R., includes 20 tourist cars, 18 standard sleeping cars, 9 dining cars, 20 mail cars, 20 first-class coaches, and 13 compartment observation cars. Travel has been heavy all through the summer season, and the C.N.R. is inaugurating shortly new trains to round out a daily transcontinental service in both directions across Canada. The new steel equipment that is now under construction for the National lines is most modern in every respect.

**Want a Six-Hour Day.**—The United Mine Workers of America at a recent convention formulated demands for a six-hour day, 60 per cent. increase in all mine wages, and a five-day week, with time and a half for overtime and double time for holidays and Sundays. The convention adjourned to await the result of the joint wage scale conference, with the operators of the central competitive district. If a satisfactory issue is made of this conference they

bership is open to Canadians interested in the development and manufacture of electric furnaces, materials, supplies or equipment. It is becoming increasingly evident that the electric furnace is about to become a big factor in the metal industry, not only in connection with the production of steel and steel castings, but also in malleable and grey iron castings. An authority states it to be an established fact that the strength of a grey iron casting poured from an electric furnace can be improved from 50 to 90 per cent.

**For Trade Abroad.**—If any Canadians are interested in the following, write: Intelligence Branch, Trade and Com-

**OVENS**

Japanning and Varnishing Ovens heated by Gas, Electricity, Steam or Coal. Kernchen Siphonage Ventilators, Bakers' Ovens, trucks, casters, etc. Write for Booklet.

**Brantford Oven & Rack Co., Ltd.**  
Brantford, Canada.

of the Engineering and Machinery Corporation of Canada, St. Catharines, are paying a bonus of 5 per cent. to all their workmen, on the year's wages ending July 31 last.

**The Electric Furnace.**—At a recent conference of metallurgical specialists in Chicago, an Electric Furnace Association was formed with Aitchison Smith, Niagara Falls, N.Y., as president. Mem-



will reconvene at Indianapolis to accept or reject it. If no agreement is ratified before November 1 a general strike of bituminous miners will automatically ensue on that date. This may easily extend to the Canadian fields if the International officers so desire.

**MORTON MANUFACTURING CO.**  
PORTABLE PLANERS  
DRAW CUT SHAPERS  
SPECIAL DRAW CUT R R SHAPERS  
FINISHED MACHINE KEYS  
STATIONARY & PORTABLE KEY WAY CUTTERS  
SPECIAL LOCOMOTIVE CYLINDER PLANERS  
OFFICE: WORKS: MUSKOGEE HEIGHTS, U.S.A.

## Get Bigger Pay through ELECTRICITY



You will find in **HAWKINS GUIDES** just what you need to know about electricity. In simple, concise, and complete, cut-and-dry language, the guides give you a complete standard course in electrical engineering. Send for your set today to look over.

**HAWKINS ELECTRICAL GUIDES**

3500 PAGES  
4700 PICTURES  
POCKET SIZE  
FLEXIBLE COVERS  
\$1 A NUMBER  
\$1 A MONTH

Magnetism—Induction—  
Experiments—Dynamoelectric  
Electric Machinery—Motors  
—Armature—Armature Windings—Installing of Dyna-  
mos—Electrical Instrument Testing—Practical Manage-  
ment of Dynamos and Motors—Installation Systems—  
Wiring—Wiring Diagrams—Wiring Tables—Storage Bat-  
teries—Principles of Alternating Current—Alternators  
—Alternating Current Motors—Transformers—Con-  
verters—Rectifiers—Alternating Current Systems—Circuit  
Breakers—Measuring Instruments—Switch Boards  
—Power Stations—Installations—Telephones—Telegraphs—  
Wireless—Rels—Factories—Household—Also many modern  
Practical Applications of Electricity and Ready Reference  
Index of the 10 numbers.

Shipped to you FREE. Not a cent to pay until you see the books. No obligation to buy unless you are satisfied. Send coupon now—today—and get this great help library and see if it is not worth \$100 to you—you pay \$1.00 a month for 10 months or return it.

**SEND NO MONEY**

THEO. AUDEL & CO., 72  
Fifth Ave., N. Y. Please  
submit for examination **HAWKINS**  
Electrical Guides. If you  
are satisfied, please send me the books. If  
not, return them to you. I will  
send you a new book free of charge.  
seven copies and to further mail you \$1 each  
month until paid.

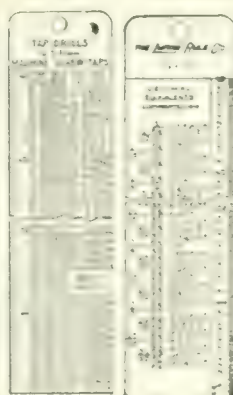
Signature \_\_\_\_\_

Occupation \_\_\_\_\_

Employed by \_\_\_\_\_

Residence \_\_\_\_\_

Reference \_\_\_\_\_



## A Handy Machinists RULE

Combining mea-  
surements 1/32-  
nds—1/64ths to-  
gether with tap  
drill sizes and  
decimal equiva-  
lents.

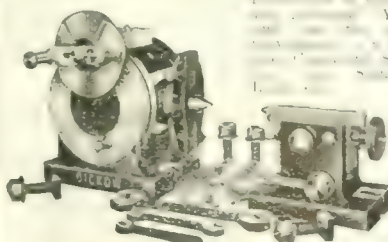
**LUFKIN**

## TAPES AND RULES

Accurate and Durable

THE LUFKIN RULE CO. OF CANADA, LTD.  
WINDSOR, ONT.

## Dickow's 10-in. Universal Index Centers Have Time and Labor Saving Accuracy



Patents Pending Prompt Delivery  
For Dependable Accuracy Get Dickow's  
Sold by dealers.  
Write us for complete description  
Fred C. Dickow, 1859 W. Lake St., Chicago, Ill.

## PLEWES Limited

WINNIPEG  
For All

## Machinists' Supplies

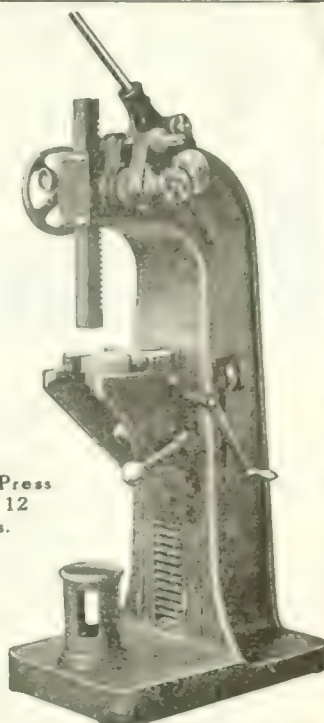
*Machine Tools*  
FOR SHIPBUILDERS ETC. ETC

**BERTRAMS LIMITED**  
SCIENNES EDINBURGH

## CASTINGS

Medium Weight Grey Iron, Brass, Etc.  
JOBGING

**GREENLEAFS, LIMITED**  
Belleville, Ontario



No. 4 Press  
10 to 12  
tons.

Write for complete information on  
Atlas Arbor Presses. All sizes for all  
purposes.

**ATLAS PRESS CO.**  
330 N. Park St.  
Kalamazoo, Mich., U.S.A.

## Clear Wired and Frosted Portlights



PROMPT DELIVERIES

Canadian Representative:

**John Lindsay**

34 Victoria Street, Toronto



# CLASSIFIED ADVERTISING

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order \$1.00. Display rates on application.

## SECTION

### HELP WANTED

**WANTED FIRST-CLASS DIE SINKERS ON** Automobile Drop Forge work. Apply stating experience and wages expected, to Canada Pole and Shaft Co., Ltd., Merriton, Ontario. (c19m)

**WANTED TECHNICALLY TRAINED MAN,** with a view to taking up designing of electrical apparatus, principally A.C. Motors. An opportunity for the right party. Box No. 630, Canadian Machinery. (c15m)

### MACHINE WORK WANTED

**MACHINE WORK WANTED FOR LATHES,** shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

### PATTERNS

**TORONTO PATTERN WORKS, 65 JARVIS** Street, Toronto. Patterns in wood and metal for all kinds of machinery. (ctfm)

**BRANTFORD PATTERN WORKS ARE PRE-** pared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell Phone 631; Machine Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (ctfm)

### Wanted

A firm of Canadian engineers to manufacture and sell on royalty basis a hand-operated stoker. This is an established appliance, and is the ideal installation for the small plant, where investment cost is an important item. Combustion principles are same as on highest priced automatic stokers. The ideal stoker for the Canadian market, where the one boiler plant is in the majority. Write to Box 632, Canadian Machinery, 143 University Ave., Toronto, Canada.

### PATENTS FOR SALE

Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

**Allentown Experimental Works**

Allentown, Pa., U.S.A.

### Mining Machinery for Sale

**Alley & McLellan Air Compressor 600** ft. at 100 lbs. pressure, 125 H.P. Motor, heavy duty 600 R.P.M. 3 phase 60 cycle 550 volts.  
**Ingersoll-Rand 800 ft. Air Compressor,** 1 Tube Mill Fraser & Chalmers 5 x 22. 1 Power & Mining 5 x 22.  
**Also large assortment of Pumps, Tanks, Classifiers, Boilers and Mining Equipment for sale.**

### Zenith Coal & Steel Products Limited

402 McGill Building Montreal  
1410 Royal Bank Bldg., Toronto, Ont.

WHEN WRITING ADVERTISERS  
PLEASE MENTION THIS  
PAPER

### BRASS ROD For Sale

At a Very Attractive Price

### Free Turning Round Brass Rod

Mill lengths of the following sizes:— Diameter

30,000 lbs...	.250"	1/4"
24,500 lbs...	.533"	Abt. .17/32"
62,500 lbs...	.625"	5/8"
73,250 lbs...	.750"	3/4"
27,500 lbs...	.9375"	15/16"
46,750 lbs...	1.000"	1"
45,000 lbs...	1.250"	1 1/4"
26,000 lbs...	1.375"	1 3/8"
39,000 lbs...	2.000"	2"

Above is all new material stored at the manufacturers' plant in Connecticut, ready for prompt shipment and has passed Government inspection. Address Box 625 Canadian Machinery.

### Re-Built Machine Tools For Sale at Bargain Prices

**One Oliver Tool Room Lathe, 16 in. by 7 ft.** bed complete with taper attachment, relieving attachment, chuck and hollow spindle double gear large and small face plate and steady rest in perfect condition.

**One Lathe Tool Room Lathe, plain change gears, single back gear, hollow spindle, 16 in. by 6 ft. bed.**

**Ten C.M.C. Lathes, 20 in. by 8 ft. bed, double back gear, hollow spindle, semi-quick change case.**

**Two Davenport, 22 in. by 10 ft., quick change gear Lathes, like new, very cheap.**

Also full line of other Machine Tools and Wood-working Machinery. For full particulars apply to the Canadian Equipment & Tool Works, 179 St. James St., Montreal, Que. (c15m)

### FACTORY AVAILABLE

Ingersoll, Ont., offers a factory of twenty thousand square feet of floor space on terms which cannot be equalled in Canada. Are you interested?

Write S. A. GIBSON, Industrial Commissioner, or MAYOR J. V. BUCHANAN, Ingersoll. c14m

One of the things we all do well is to forget.

Names that were household words yesterday are gone to-day.

Because people knew your Name and your Line a year ago it is no sign they do to-day. They forget easily.

Keep yourself in the public mind by advertising. It is just as important to make old friends remember as it is to win new friends. Advertising does both.

# SPECIALISTS

**In Railway, Marine and  
Industrial Supplies**

Duntley Dayton Pneumatic  
Tools.

Daniel's P.P.P.

Ebonite Packing.

Pump Valves.

International High Pressure Sheet Packing.

International Red Rubber Packing.

Plastic Metallic Packing for Piston Rods  
and Valve Stems.

Paxton & Mitchell Locomotive Rod Pack-  
ing.

Rapid Hose Coupler, for all Hose Con-  
nections.



*Write or Wire Your Requirements*

**International Machinery and  
Supply Company, Limited**

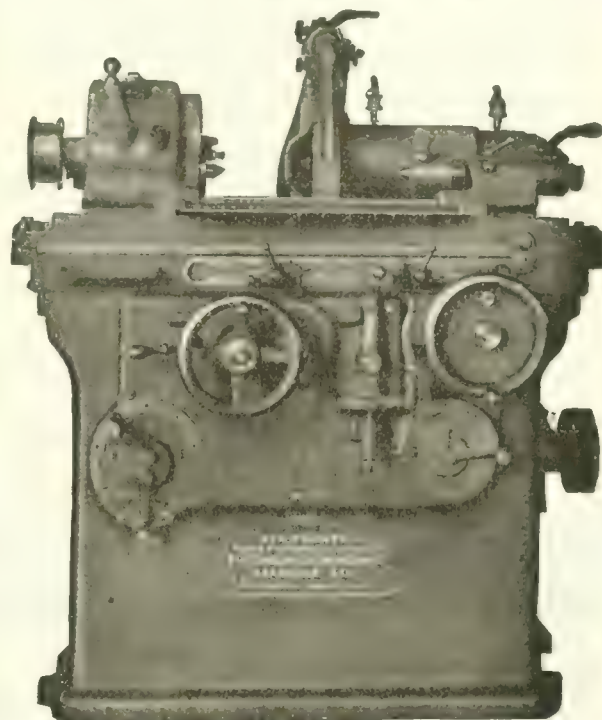
371 St. James St., Montreal

# FITCHBURG

**PLAIN CYLINDRICAL  
GRINDING MACHINES**

**Model "A" 8" x 36"**

**in Toronto Stock**



This grinder is designed with extra heavy rigid saddle and headstock of rugged design. The capacity of machine eliminates the necessity of purchasing a heavier machine, for the design allows for wheels up to 3' in width. It is especially adapted for automobile parts where production counts.

Size of Grinding Wheel . . . 16" diameter 1" to 3" face 5" hole.

Number of Grinding Wheel Speeds, 2; 1400 to 1640 R.P.M.

Number of Work Speeds, 6; 64 to 340 R.P.M.

Number of Table Feeds, 6; 28" to 150" per min.

This machine will interest you. Write for our Model A circular.

**Garlock-Walker Machinery  
Company, Limited**

32 Front St. W., Toronto

Montreal

Winnipeg

# PARTIAL LIST OF TOOLS

- 2—60" Bullard Vertical Boring Mills
- 1—60" Niles Vertical Boring Mill
- No. 4—B. & S. Plain Miller
- 1—36" x 36" x 8' Gray Planer, two heads
- No. 3—Cincinnati Universal Miller
- 5—No. 0 Steptoe Hand Millers
- 13" x 5' 6" New Carroll-Jamieson Quick-Change Lathe
- 14" x 6' New Carroll-Jamieson Quick-Change Lathe
- 15" x 6' New Sidney D.B.G. Quick-Change Lathe, swing 17"
- 15" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 17"
- 17" x 8' New National Quick-Change Lathe
- 3—17" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 19"
- 17" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 19"
- 18" x 24" New Rahn Larmon Lathe, D.B.G. Quick-Change
- 19" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 21"
- 9—19" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 21"
- 25" x 14' New Sidney D.B.C. Quick-Change Lathe, swing 27"
- 33" x 14' Putnam, arranged for Motor Drive
- 6' Western Radial Drill
- 5' Bickford Single Pulley Drive Radial
- 100-lb. New Little Giant Hammer
- 50-lb. New Little Giant Belt Hammer
- 25-lb. New Little Giant Belt Hammer
- 30-ton Watson & Stillman Hydraulic Press

**FRANK TOOMEY INC.**

27 North Third Street

PHILADELPHIA, PA.



# Welding and Cutting Apparatus

Canadian Rights for Sale Covering Well-Known and Profitable Oxy-Acetylene and Oxy-Hydrogen Welding and Cutting Equipment.

An excellent opportunity is offered to established brass manufacturing shop or a small manufacturing company to be organized to produce in Canada complete line of welding and cutting apparatus.

This equipment was placed on the United States market early in 1918, is fully protected by United States patents, and Canadian patents have been applied for within the required time.

Already being sold in Canada to an extent which will insure success of Canadian manufacturing company. Can be handled either direct or through jobbers. Net profits very large.

Patents, complete blue prints and specifications of entire line, as well as initial services of designer and inventor, may be obtained at a reasonable figure.

Box 631

**Canadian Machinery and Manufacturing News**  
Toronto, Canada

## STEEL TANKS

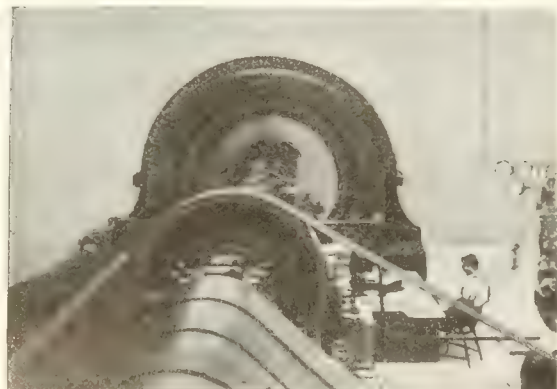
THE  
**TORONTO IRON WORKS**

HEAD OFFICE:  
ROYAL BANK BLDG.

LIMITED  
**TORONTO**

WORKS:  
CHERRY STREET

Oil Storage, Gasoline Tanks, Air Receivers, Pneumatic Water Supply Tanks, Smoke Stacks, Boiler Breeching, Riveted Steel Pipe, Bins and Hoppers. Heavy and light steel plate construction erected anywhere.



5000 H.P. Morse chain (4 strands) operating generator from water wheel.

## “Renold” or “Morse” Silent Chains

are employed throughout Canada on Main Drives, Municipal Fire Pumps, etc., Evidencing Absolute Reliability.

**Jones & Glassco, Regd.**

Canadian Agents

**Toronto**

**Montreal**

# SPECIAL MACHINERY

Special Machinery, Gears, Jgs. Fixtures, Punches and Die  
Small Tools, Screw Machine Products, Gauges, Etc

# CONTRACT WORK

WE CARRY

## High Speed Reamers, Cutters and Drills

IN STOCK HERE

Prompt Service

**The J. A. M. Taylor Tool Co.**  
*Machine Shop Supplies*

318 Stair Building Toronto

**Elliott & Whitehall Machine & Tool Co.**  
GALT, ONTARIO, CANADA

### MILLING CUTTERS AND SMALL TOOLS



We manufacture the following tools, etc.  
Standard and Special Milling Cutters of all descriptions, Gear Cutters, Hand Reamers, Shell Reamers, Chucking Reamers and Taper Pin Reamers, Lathe Mandrels and Arbors, Metal Stamping Dies, Gauges, Jigs and Fixtures, Etc.

All equipment required for rapid and economical production of interchangeable parts. Prompt attention to all work.

ASK FOR OUR NEW CATALOGUE No. 10.

## WELDING APPARATUS AND SUPPLIES

**The REGO 100% Efficient Welding Torch**  
Saves Oxygen Eliminates Flash-Back Better Welding  
*Write to us for anything and everything you need.*

**WELDING & SUPPLIES COMPANY**  
C. ROYER, Manager 1142 Ontario Street East, MONTREAL

**VICTORIA Special Machinery**  
DESIGNS PATTERNS  
CASTINGS FORGINGS

*Send for Catalogue*

Victoria Foundry Co., Limited, Ottawa, Canada

## TOOLS & STAMPINGS



We have the equipment to make the tools and produce the stamping. Let us quote on your requirements.

**HOMER & WILSON**  
*Stamping and Tool Works*  
1-5 Lancaster St., Hamilton



# SHAFTING

Cold Drawn, Turned and Polished Steel,  
Rounds, Squares, Hexagons and Flats,  
Steel Piston Rods, Pump Rods

Special facilities for Keyseating up to 6 in. diameter.

THE  
**Canadian Drawn Steel Co.**  
HAMILTON LIMITED CANADA


# SPECIAL MACHINERY

## Built to Order

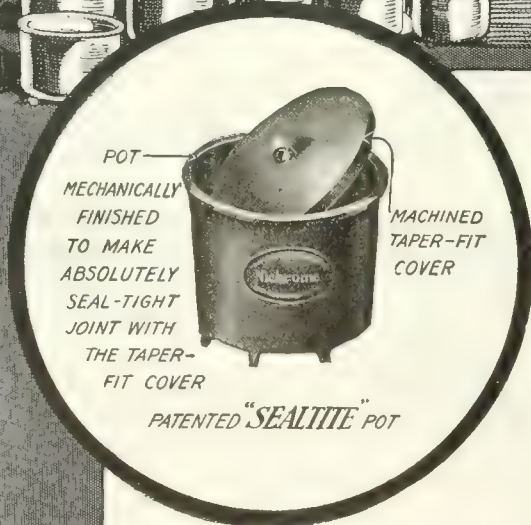
Also gauges, punches, jigs, dies, small tools, etc.  
Prompt Service.  
Moderate cost.  
Send Blueprints for estimate.

**Brown Engineering Corporation**  
LIMITED, TORONTO

415-419 King St., W. Tel. Ad. 425







# Nichrome Castings

## for Heat Treatment

Cast Nichrome may be machined without great difficulty. With the machined gas sealing cover, furnished with the "Sealtite" pot as shown in the figure, no fire-clay is required for sealing the cover, and the

heat treatment penetration shows a large percentage increase over that of iron and steel pots.

According to the noted Italian physicist, Dr. F. Giolitti, carbon monoxide is the most active agent in the cementation and case-hardening of steel.

The taper-fit gas seal of the patented "Sealtite" pot lasts as long as the pot is serviceable. The gases necessary for carbonizing are confined within the container and it has been shown that an increasing depth of case results from the increased gas pressure.

A considerable saving in time and carbonaceous compound has been obtained by some users of the "Sealtite" pot.

Write for further particulars.

Manufactured under Henderson patents.

27

CANADIAN DRIVER-HARRIS CO., Ltd.

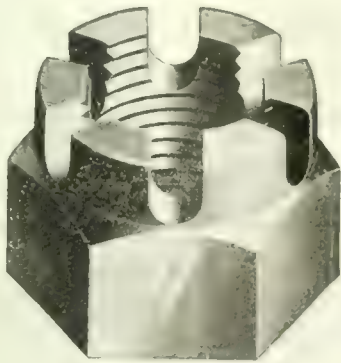
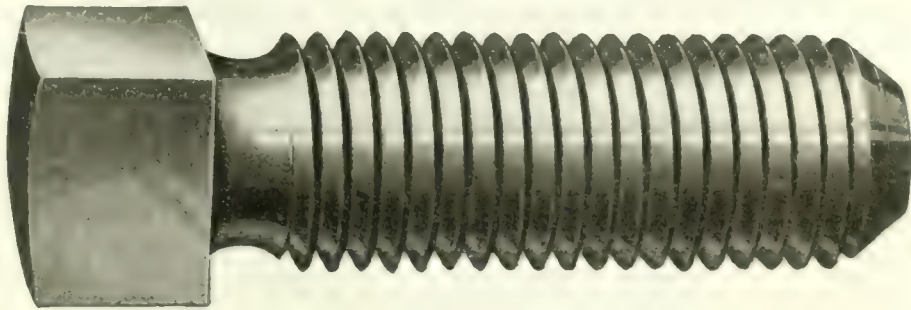
WESTERN OFFICE AND DEPOT  
CHICAGO  
26 SO. JEFFERSON ST.

WALKERVILLE, ONT.  
CANADA  
AMERICAN OFFICE AND WORKS  
HARRISON, N. J.

BRITISH WORKS  
MANCHESTER  
ENGLAND



# SCREW MACHINE PRODUCTS



**SET SCREWS**

V. AND U.S. STANDARD

**CAP SCREWS**

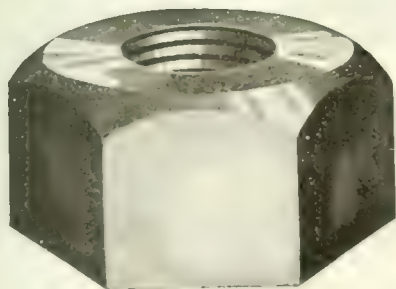
S. A. E. AND U.S. STANDARD

**S.A.E. NUTS**

PLAIN OR CASTELLATED

**U.S.S. NUTS**

SEMI - FINISHED



*SPECIAL SCREW MACHINE*

*WORK TO CUSTOMERS*

*SAMPLES OR BLUE PRINTS*



**THE NATIONAL ACME  
· COMPANY ·**

**DE COURCELLES & G.T.R. MONTREAL P.Q.**



# Opportunity Knocks Here Every Week!

It may not knock for **you** this week, but read these pages regularly and grasp the opportunity when it presents itself. Every ad here is an opportunity for someone! Your time is coming. If you think the time is ripe to spring that little proposition of yours, send in your copy now for the next issue. If it is of interest to our readers, rest assured it will get attention.

## CANADIAN MACHINERY

*Classified Advertising Section*

143 University Avenue

TORONTO



**XXX**

### Genuine Arctic Metal

will give satisfactory results in the most troublesome bearings. Will last longer and save many times its cost in repairs. Will reduce your overhead expense.

**Tallman Brass & Metal Limited**  
**HAMILTON, ONT.**

## DIAMOND TOOLS

FOR TRUEING GRINDING WHEELS



### THE GENERAL SUPPLY COMPANY of CANADA, LIMITED

OTTAWA  
356 Spark St.

TORONTO  
38 Toronto St.

MONTREAL  
408 McGill Bldg.

WINNIPEG  
85 Water St.

VANCOUVER  
906 Vancouver Block

*Sole Canadian Agents for*

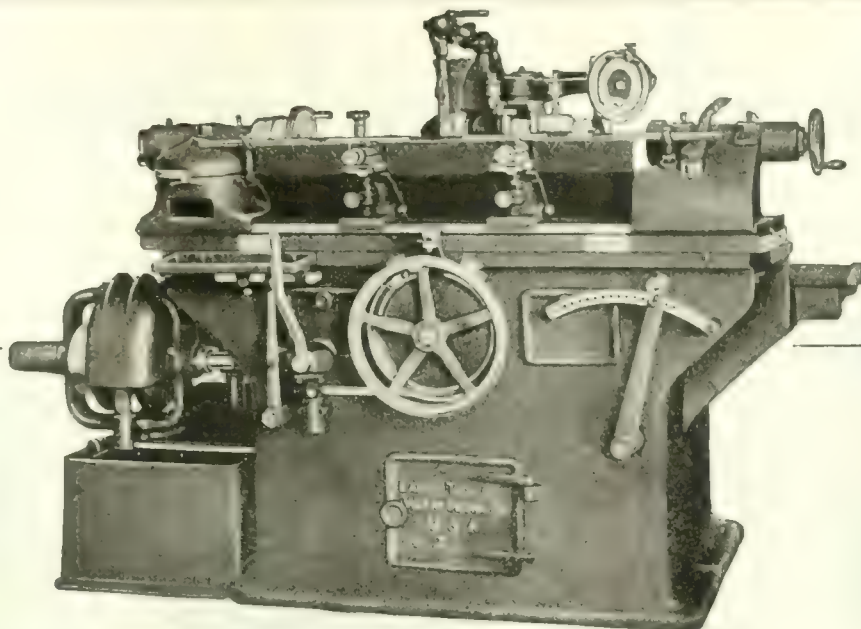
### THE JOYCE-KOEBEL COMPANY, INC.

Formerly Geo. A. Joyce Co. Ltd.

NEW YORK

LONDON

**LANDIS**



## "You Can Do It On The LANDIS Universal"

That's the answer to every query as to big production and the grinding possibilities on accurate or unusual work in hundreds of America's foremost shops.

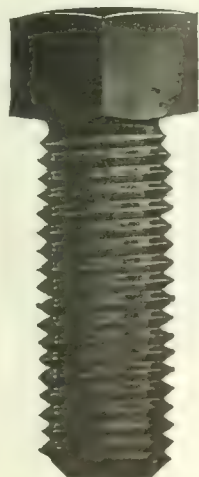
The Landis Universal is particularly adaptable for every type of gauge making.

The widest range of work is handled by this machine with ease because of the simplicity of design of its various features.

Write for further details.

**LANDIS TOOL COMPANY, Waynesboro, Pennsylvania, U. S. A.**  
New York City: 50 Church Street

# ACCURACY



When you want Cap and Set Screws and Semi-finished or Finished Hexagon Nuts for your rush jobs send your order to us. Prompt service with accurate goods.

**THE  
GALT MACHINE SCREW CO., LIMITED**  
**GALT, ONTARIO**

Eastern Representatives: The Canadian B. K. Marten Company Limited, 49 Common St., Montreal, Que.

## Let them know it's there

In complimenting us upon the results secured from their advertisement in the classified section, one advertiser said:

"Of course we would not have sold it without letting people know it was here, that is obvious, and thanks are due you for letting the people know it was for sale."

If you have any old or used equipment for sale, let people know it's there. Your message in Canadian Machinery will be placed before the probable buyers of such equipment.

**Canadian Machinery**

*Classified Advertising Section*

**143 University Ave., TORONTO**



# Mechanical Engineering Books

If you are desirous of improving yourself in your trade and so putting yourself in the position of making more money, these Mechanical Engineering Books will be found helpful.

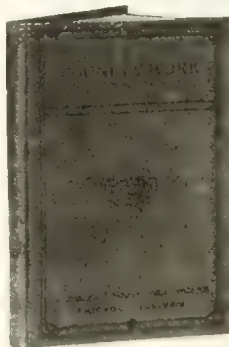


**MACHINE-SHOP WORK.** By Frederick W. Turner, Instructor in Machine-Shop Work, Mechanics Arts High School, Boston. 208 pp., 241 illus. Cloth binding. The use of various hand tools is explained, followed by a comprehensive discussion of the lathe and lathe tools, with the methods of screw cutting, taper and eccentric turning, etc. The way to figure compound gears for screw cutting; drilling; boring; planers; shapers; slotters; milling machines and cutters; how to cut spirals, gears, cams, etc.; grinding; the operation of automatic machines. Price .....\$2.00

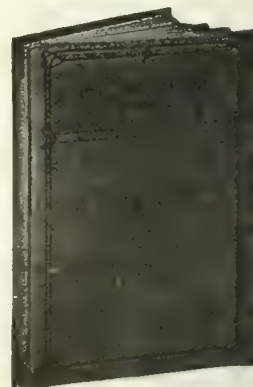


**MECHANICAL DRAWING.** By Ervin Kenison, S.B., Assistant Professor of Mechanical Drawing, Massachusetts Institute of Technology. 176 pp., 120 illus. Cloth binding. Gives a course of practical instruction in the art of Mechanical Drawing, based on methods that have stood the test of years of experience. Includes orthographic, isometric and oblique projections, shade lines, intersections and developments, lettering, etc., with abundant exercises and plates. Price .....\$1.25

**FOUNDRY WORK.** Revised by Burton L. Gray, instructor in Foundry Practice, Worcester Polytechnic Institute. 224 pp., 191 illus. Cloth binding. A practical handbook on standard foundry practice, including hand and machine molding, cast iron, malleable iron, steel and brass casting, foundry management, etc. Includes use of various types of molding machines. Price, \$1.25

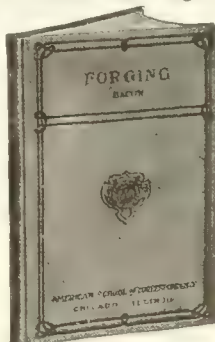


**PATTERN MAKING.** By James Ritchey, Instructor in Wood Working, Armour Institute of Technology. 160 pp., 250 illus. Cloth binding. Shows the reader how to take the blueprint and from it make the pattern for any kind of casting under any condition. The allowances for shrinkage, draft, and finish are explained. Simple and built-up patterns of all kinds are clearly treated. Various special cases are taken up, such as pulleys, cranks, pipe connections, valves, etc. Price.....\$1.75



**MACHINE DESIGN.** By Charles L. Griffin, S.B., Assistant Engineer, the Solvay-Process Co., American Society of Mechanical Engineers. 208 pp., 82 designs. Cloth binding. Explains in detail how to make the entire design of all kinds of machinery, how to lay out gears, etc., with complete specimen designs of numerous machines. Price ... \$1.75

**TOOL MAKING.** By Edward R. Markham, Consulting Mechanical Engineer, formerly Superintendent of the Waltham Watch Tool Co., American Society of Mechanical Engineers. Author of "The American Steel Worker." 224 pp., 325 illus. Cloth binding. Takes up the methods of treating tool steels—annealing, tempering, spring tempering, hardening, case-hardening, etc.; how to make drills and reamers of all kinds; the making of arbors and mandrels, taps, hobs, reamer and tap-holders, jigs, gauges, dies and die-holders of all kinds, counterbores, facing tools, milling cutters, hollow mills, and forming tools. Gives all necessary information for tool making in all its branches. Price .....\$1.75



**FORGING.** By John Lord Bacon, Eng. and Supt. of Construction, with R. P. Shields & Son, San Diego, Cal., American Society Mechanical Engineers. Author of "Forge Practice." 128 pp., 180 illus. Cloth binding. A working handbook of practical instruction in hammering, working, forming, and tempering of wrought iron, machine steel, and tool steel, including the important modern development of electric welding. Price .....\$1.25



Sent postpaid on receipt of price. We can also furnish you with other standard works on Engineering in all its branches, including books for Civil Engineers, Contractors, Electricians, Foundrymen, Steam Engineers, Mechanical Engineers, Municipal Engineers, Railroad Engineers, Sanitary Engineers, Gas Engineers, Hydraulic Engineers, Technical Men.

## Technical Book Department

MacLean Publishing Company

143 University Ave., Toronto

# RAISED!



*"Those Chapman Bearings have been such a big saving, Bill, that I guess you are due for a raise for persuading us to put them in."*

This was the conversation of the boss to his foreman.

You, too, will find it to your interests to find out how much Chapmans will save in your plant. Write us stating:

1. About how many hangers you have,
2. Kind of bearings with which they are equipped,
3. Horsepower used,
4. Kind of power—steam, electric or gas,
5. Whether you are or are not carrying an overload, and if so, how much.

Records taken where plants have changed from Lubbert to Chapman Ball Bearing show a 10-100% saving of the total power. They pay for themselves within two years. In some plants they have saved enough in power, lubrication and attention to pay for themselves in six months.

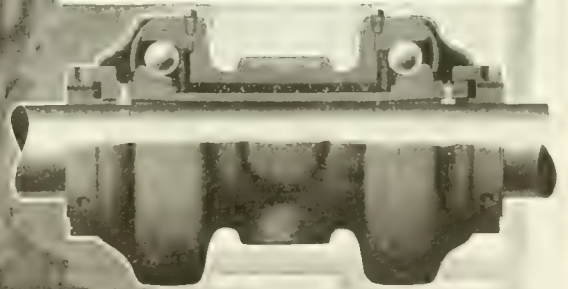
Figure out what a saving of 10% would mean in your plant, then sit down now, on to-morrow at home and send us the above information. Help your self by helping our firm.

Send the above information and ask for catalogue 3-B.

**CHAPMAN DOUBLE BALL BEARING CO.**

347 Sorauren Ave.

TORONTO



# DOUBLE BALL BEARINGS Chapman

**"YOU PAY FOR THEM WHETHER YOU BUY THEM OR NOT"**



# **BUYERS!!!**

## **The International Machinery Exposition**

*Opens in the Greatest of World Markets*

### **GRAND CENTRAL PALACE**

**Opening Date to be Announced Later**

---

**PERMANENT · COMPREHENSIVE · REPRESENTATIVE**

---

**B**UYERS!! Come to the Palace of Machinery if you are looking for efficient modern production machinery. See the reliable and representative products of the best mechanics and geniuses in America. The tried and proven product no matter what its cost is the economical purchase. See what America offers to the world at this permanent comprehensive exposition:—

Prime Movers, Machine Tools, Presses, Lathes, Milling Machines, Belts, Drills, Radials, Gear Shapers, Chucks, Turrets, Bearings, Grinders, Taps, Welders, Slotters, Screw Cutters, Boring, Can-Making, Wood-Turning, Saw-Making, Tack-Making, and other automatic machines of various types—in short, every modern machine used in making machinery, and every exhibit guaranteed in all claims by American firms of magnitude and irreproachable worthiness.

---

*Buyers!* You can see and examine this vast array of mechanisms only at one place—Grand Central Palace, New York, opening soon.

---

**Machinery Makes the World Go!  
America Makes the Machinery!  
The International Machinery Exposition Exhibits It!**



**New York**

# MARTEN

MACHINE CO. HAMILTON. ONT.

## ACCURACY-RELIABILITY

**ACCURATE**

**MACHINES, EQUIPMENT  
APPLIANCES and TOOLS**  
for  
**SPECIAL PURPOSES**  
DESIGNED AND BUILT

We will make what YOU want  
as you want it.

Write us about it.

**WOOD METAL PATTERNS**  
**PATTERNS Hand and Machine**

**OUR REGULAR PRODUCTS:**  
**THREAD GAUGES**  
**SNAP GAUGES**  
**CYLINDRICAL GAUGES**

**WE ARE GENERAL AND  
SPECIAL TOOL MAKERS**

Let us quote you on your require-  
ments, and have your tools made  
as you want them made.

**WOOD METAL PATTERNS**  
**PATTERNS Hand and Machine**

**TOOLS**

# Steel Plate Work

**BOILER  
BREECHINGS  
SMOKE STACKS  
STAND PIPES  
TANKS. BINS  
HOPPERS  
RIVETTED  
STEEL PIPES  
FLUMES AND  
PENSTOCKS**

**STRUCTURAL  
STEEL  
WORK**

Machine work  
of all descrip-  
tions. Send us  
your specifi-  
cations.

**WILLIAM HAMILTON  
CO., LIMITED**

PETERBORO

ONTARIO

# SPECIAL TOOLS

**Automatic Machinery**  
for all purposes

**Punch Press Work**

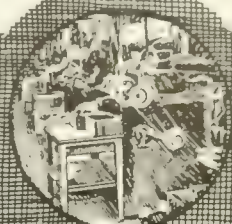
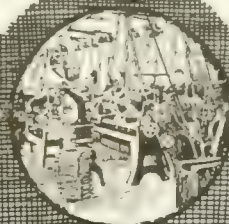
**Screw Machine Products**

*Consult us on your machine problems*

**Toronto Tool Company**

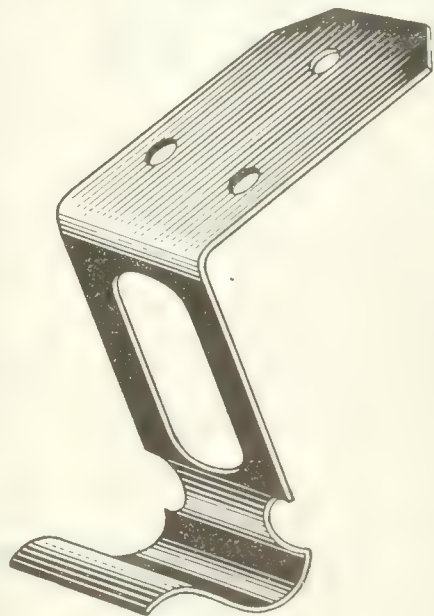
516 Richmond St. West

Phone Adel. 1181

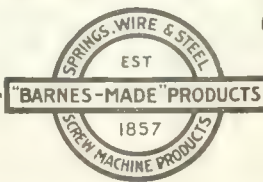




# The Wallace Barnes Company



"Barnes made  
for every trade"



## Further Evidence of Ability

Raw materials for "Barnes-made" Springs are purchased to exact specifications.

The proof of our readiness to fill orders efficiently is best given by the fact that there are always between 3000 and 4000 tons of steel on hand in 3,500 different sizes and varieties.

Out of this Stock Department come the materials from which are constructed the quality products that are individualized by "Barnes-made."

ESTABLISHED 1857

**THE WALLACE BARNES COMPANY.**

FLAT AND WIRE SPRINGS OF EVERY TYPE  
SCREW MACHINE PRODUCTS - HIGH CARBON COLD ROLLED STEEL  
MAIN OFFICE AND WORKS. BRISTOL, CONN.  
50 EAST 42<sup>ND</sup> ST. N.Y. CITY. BOOK BUILDING. DETROIT, MICH.

View in Stock Dept.

# VENUS PENCILS

**T**HE absolute uniformity—always and everywhere—of each particular degree of a VENUS Pencil, and its remarkably smooth, gritless, non-crumbling, easy writing and drawing leads, have placed this famous pencil in the offices and drafting rooms of engineers in every part of the world.

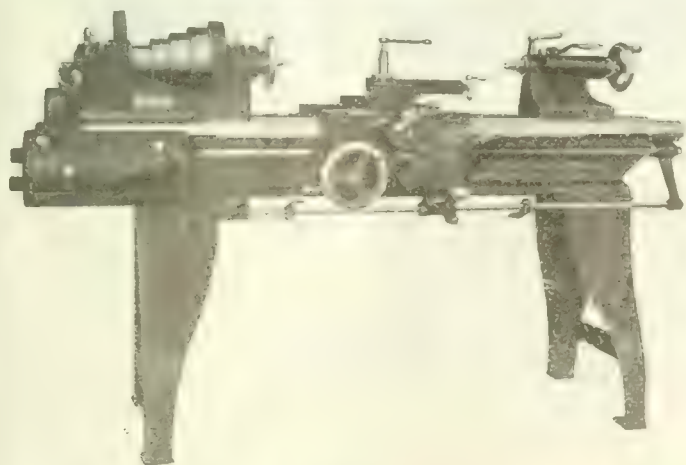
*17 Black Degrees and 3 Copying*

**Free** Send for a box of five trial samples and VENUS eraser

**American Lead Pencil Company**

238 Fifth Avenue, New York  
and Clapton, London, England

*The Largest Selling  
Quality Pencil in  
the World*



## "Star" 12'x6' Lathe

**The Paramount Machine  
for Tool Room Work**

*Economical in first cost,  
operation, maintenance  
and floor space.*

## "STAR" TOOL ROOM LATHE

Special features of the "Star" Tool Room Lathe include:

Micrometer Cross Feed Stop (Patented) eliminates all guessing at the depth of a cut.  
Automatic Stop for Carriage in either direction when actuated by friction or screw feeds.

48 feeds or threads without removing a single gear.

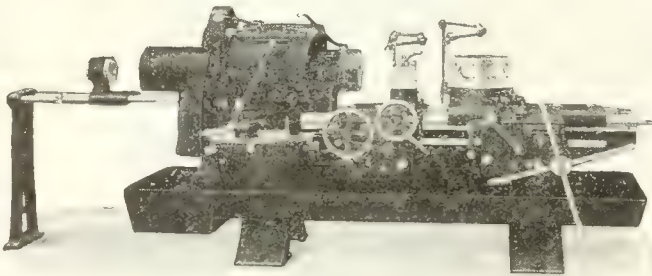
Automatic Safety Device in apron prevents engaging opposing feeds.

Our latest catalog describes other interesting features of this remarkable lathe. Send for one to-day.

**THE SENECA FALLS MFG. CO., INC., 366 W. Fall St., Seneca Falls, N.Y.**

*If interested tear out this page and place with letters to be answered.*





## Foster Universal Turret Lathe

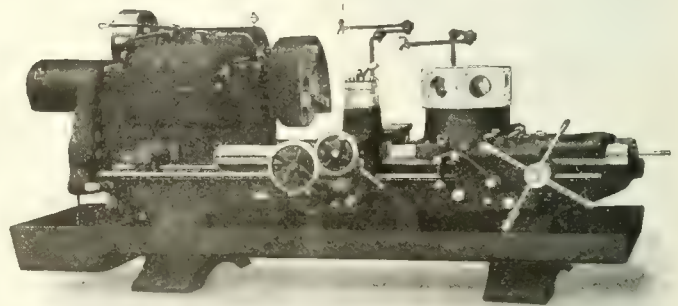
THREE SIZES

1---B

2---B

3---B

**EQUALLY EFFICIENT  
ON BAR AND  
CHUCKING WORK**



**DO YOU HAVE ANY IDLE MACHINES  
IN YOUR FACTORY?**

You probably do.

The character of the work has been shifting. Only a few months ago the war created a demand for certain articles, and your factory equipment had to be changed to meet it. To-day the post war reconstruction calls for products of another kind.

If your factory equipment is not flexible enough, if your machine tools are not capable of being adapted to the periodic changes in the character of your work, there will be idle machines in your factory eating into your profit even though you are flooded with orders.

The UNIVERSAL TURRET LATHE will adapt itself readily to the changing character of your work. It can be changed over from bar work to chucking work or vice versa in a short time and is equally efficient on either.

Furthermore, the Universal Turret Lathe will keep down your production cost to the minimum, no matter whether you handle your work in lots of 10 or 10,000 parts.

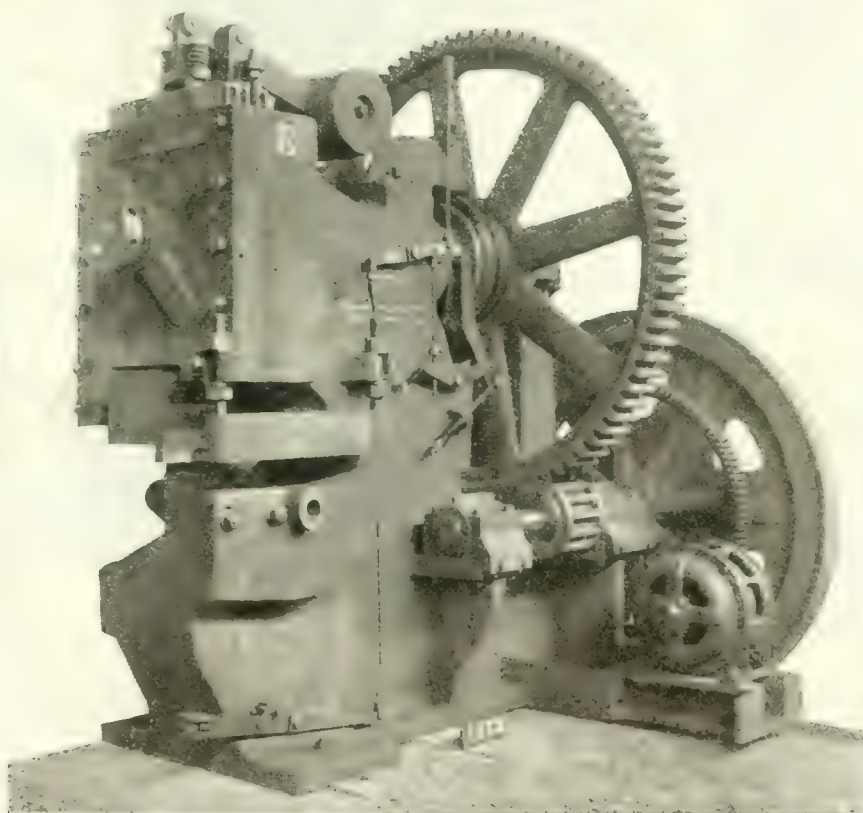
**YOU CANNOT AFFORD TO IGNORE  
THE MERITS OF THIS MACHINE.  
WRITE FOR OUR CATALOGUE AND  
LEARN MORE ABOUT IT. THEN  
SEND US BLUE PRINTS OF YOUR  
WORK AND LET OUR ENGINEERS  
FIGURE WITH YOU.**

**FOSTER MACHINE CO., ELKHART, IND.**

# "The Quality Line"

## PUNCHING and SHEARING MACHINERY

Machinery  
Equipment  
for  
Rolling Mills  
Bridge and  
Structural  
Works



Machinery  
Equipment  
for  
Steel Car  
Plants  
and  
Shipyards

No. E. OPEN THROAT BAR IRON SHEAR  
Capacity 11" x 21 $\frac{1}{4}$ " Flat, 4" Round, 3 $\frac{1}{2}$ " Square

All machines are built of same high-grade workmanship and material that have given the "L&A" product a recognized standard of quality for over 50 years.

*May we send you our big catalogue.*

### The Long & Allstatter Co.

*Established  
1856*

American Punch & Shear Works  
HAMILTON, OHIO, U.S.A.

Canadian Agents:  
RUDEL-BELNAP MACHINERY CO., LIMITED  
Toronto Montreal

*Incorporated  
1878*

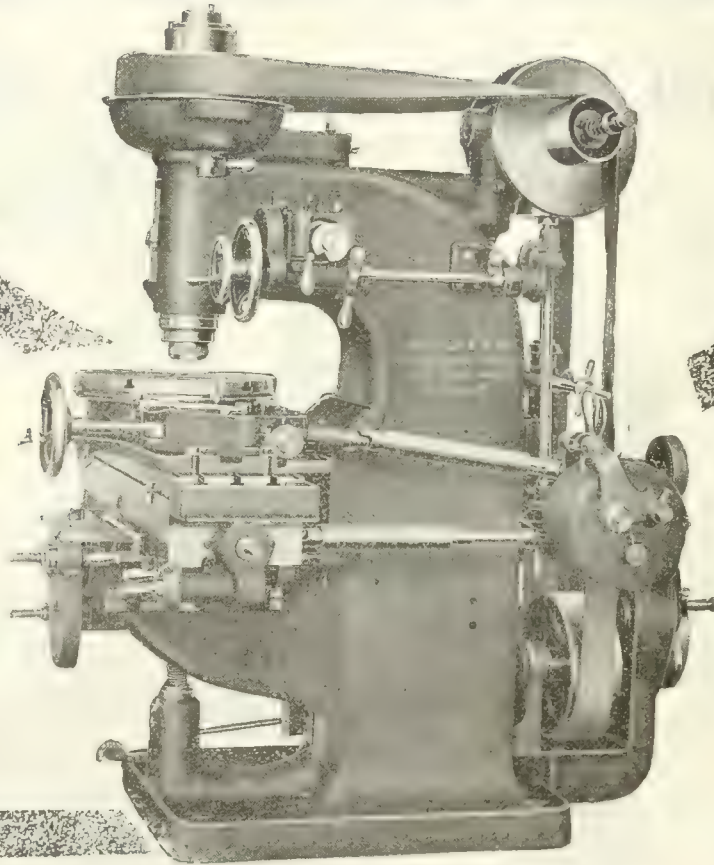
*If interested tear out this page and place with letters to be answered.*



# Becker

## "Becker Belt Driven Millers"

*The Machine  
that gives the  
Smooth Finish*



**Model  
B**

The machine shown above is a Becker Model B Belt Driven Miller—Like the other machines of this line it is a Production Tool of the first class, embodying all the features that have made Becker Millers the standard.

The strenuous period of war work has introduced Becker Belt Driven Millers into Canadian factories. They were essential then because they greatly increased production without adding to manufacturing costs—and now, they are essential also because they will enable you to reduce your manufacturing costs in order to cope with the keen after-war competition.

You need a Becker Belt Driven Miller.

Write for Circular O-501—NOW

## BECKER MILLING MACHINE COMPANY

Hyde Park, Boston, Mass.

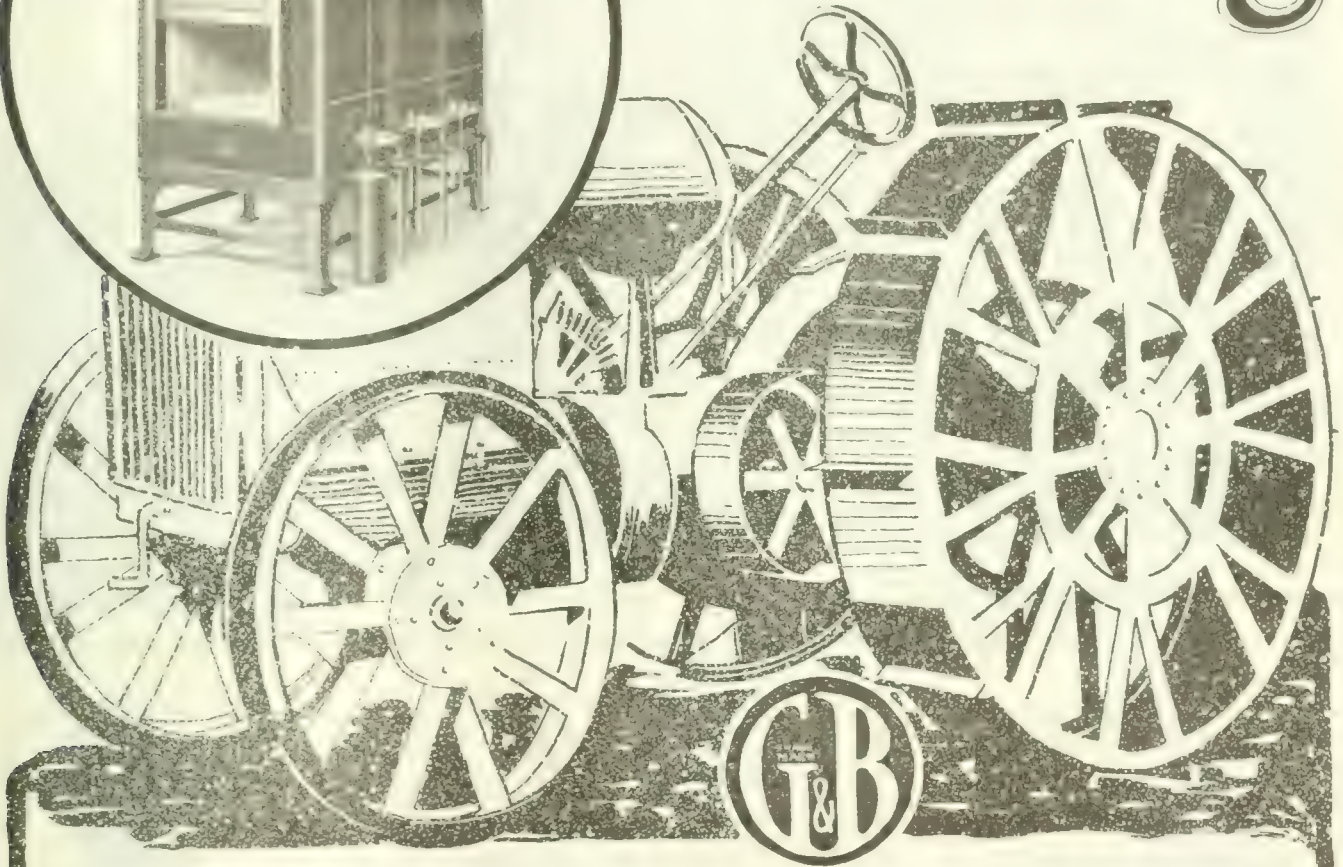
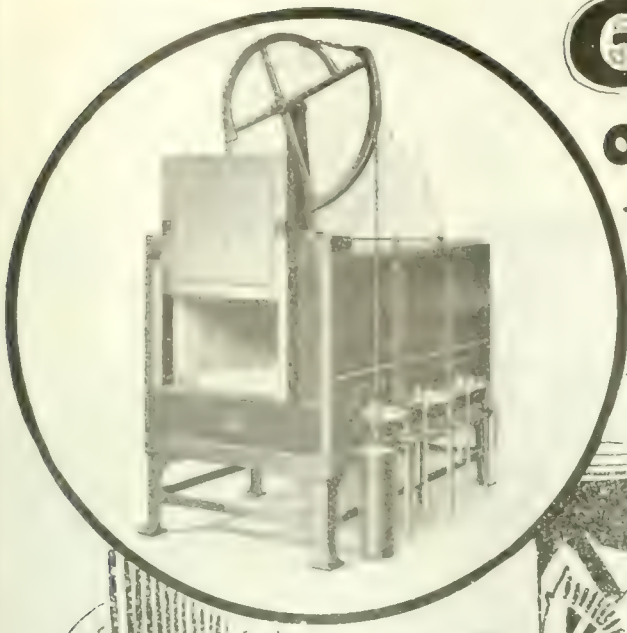
*Canadian Agents :*

Rudel-Belnap Machinery Company, Ltd., 137 McGill St., Montreal.

A. R. Williams Machinery Company, Ltd., 64 Front St. West, Toronto.



# G & B Method of Heat-Treating



## Gilbert & Barker Method the Right Method of Heat-Treating

Used by the Largest Manufacturers of Autos and Trucks.

Whether you manufacture tractors—automobiles—trucks—crankshafts—camshafts—tools—machine parts or anything else that requires heat-treating unless you have the **right** kind of heat-treating furnace for the purpose, you are defeating your own purpose, that of turning out a first-class product of uniform high quality.

**GILBERT & BARKER FURNACES INSURE  
PERFECT COMBUSTION—ABSOLUTE TEMPERATURE CONTROL  
UNIFORMITY OF HEAT**

the result of which is an exceptionally high grade product which measures up to the best manufacturing standards. There is a G. & B. Furnace exactly suited to your requirements. Let our engineers advise you—write. To-day is a better day than tomorrow to send for Bulletin 24.

### Gilbert & Barker Manufacturing Company

17 Union Street

Springfield, Mass.

ESTABLISHED 1865

New York Office: 26 Broadway.

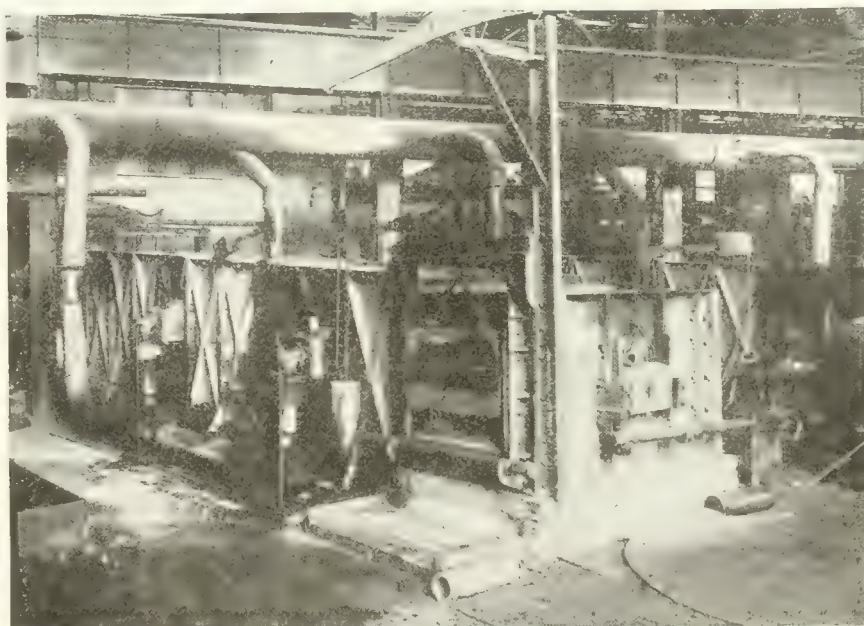
Canadian Agents: Williams & Wilson, Limited, Montreal, Que.

*If interested tear out this page and place with letters to be answered.*



# Another MECOL Furnace

demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative judges. We refer to the



"Mecol" Furnace shown in this illustration, installed at the Pointe St. Charles Works of the Canadian Steel Foundries, Limited.

Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

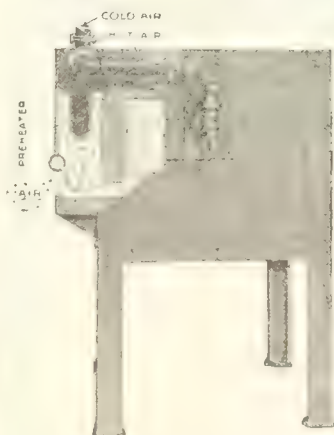
Write

**Mechanical Engineering**

Company, Limited

Room 308, Bank of Toronto Bldg., Montreal  
Three Rivers, Quebec, Canada

## ECONOMIZER FORGE



Showing deflection of hot gases, with induced air toward the furnace, and the preheating of air for combustion.

It is economical in fuel, air and power; protects workmen from flame and hot gases and the heated material from oxidation or scale; increases the quantity and improves the quality of heated products; prevents smoke, flame and heat escaping into the forge shop.

*Write to-day for  
catalogue 34-T*

Chicago Office: Ellsworth Building  
Detroit Office: Majestic Building

Canadian Representative:

**R. J. McLEAN**

128 Bleury St., Montreal, Canada



## Look at this again —closely

and read what we  
have to say  
below



**W**HEN a tap breaks off close or below the surface, you'll find the Walton Tap Extractor will save a great deal of time and trouble. The crucible fingers grasp the flutes of the tap, a twist of the wrench and the piece is out. Don't you think it would pay to have a few lying around on your benches?

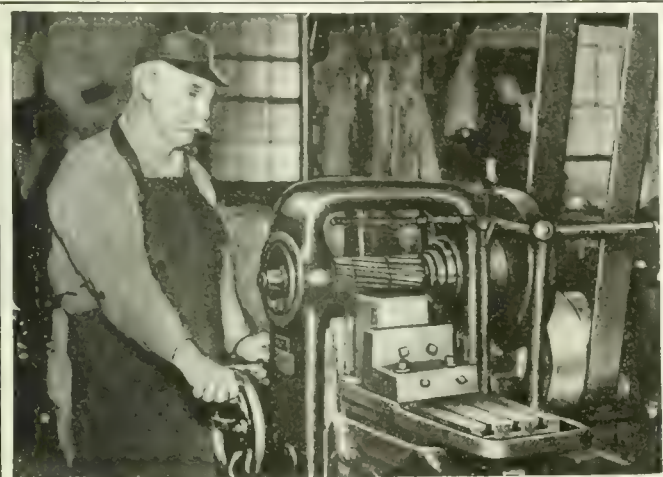
**The Walton Company**  
Hartford, Conn.



# BRIGGS

## MILLER

*Keeps Five Die  
Sinkers Going*



**H**ERE you see the Briggs Miller Squaring Die Blocks, and it is working so fast it keeps five die sinkers going.

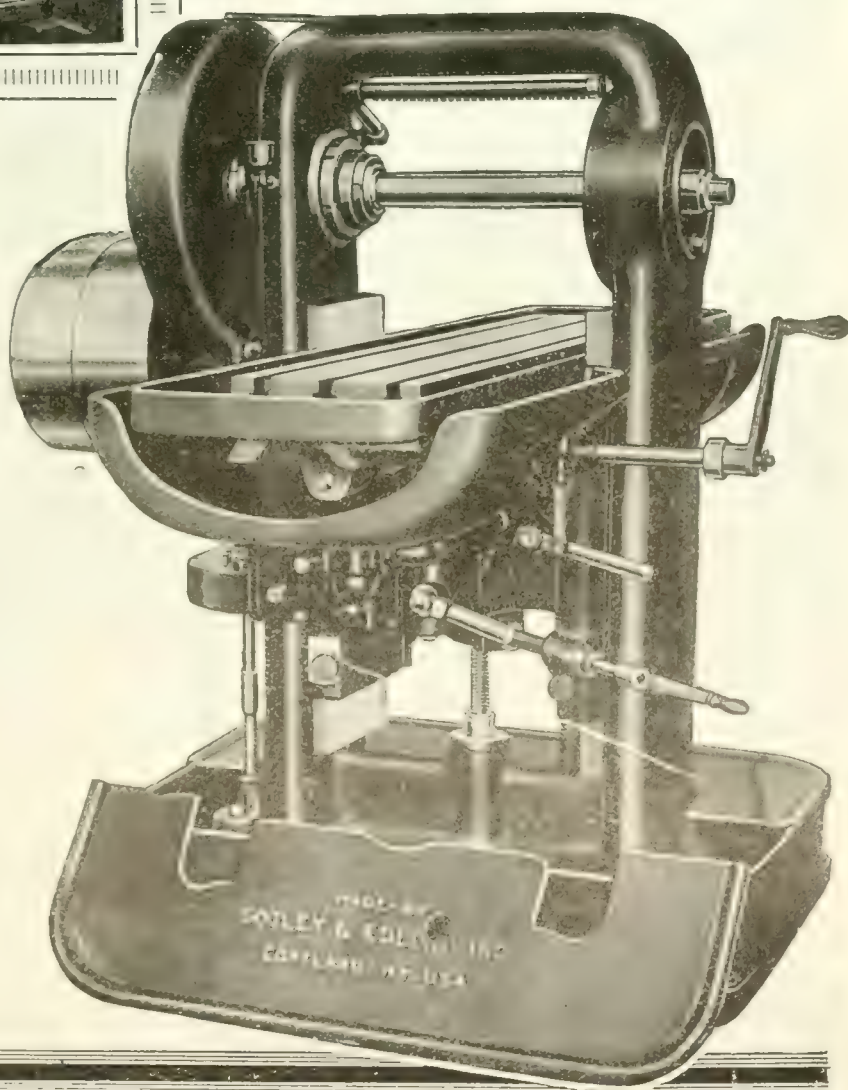
Some are new, squared from the rough; some are old, annealed, cut down and made over; some are oblong, some square, in sizes up to 9 inches. This Briggs Miller has been squaring blocks for four years; has never given any trouble. When cutters get dull the operator has another gang ready to go on with the work. Unusual rigidity accounts for Briggs' higher efficiency.

Don't you think you could use this tool to advantage in your shop? Write for the details.

**Gooley & Edlund, Inc.**  
Cortland, N.Y., U.S.A.

Garlock Walker Machinery Co., Ltd.  
Toronto, Ont.

Williams & Wilson, Ltd., Montreal



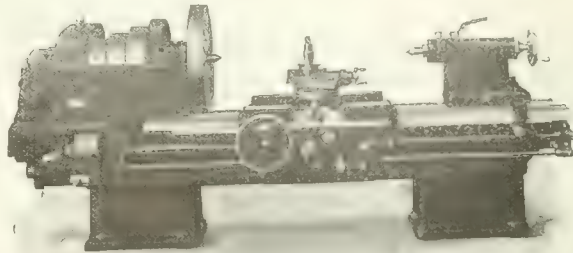


*Sidney  
for  
Service*

*Heavy  
Duty  
Engine  
Lathes*

# SIDNEY

Sidney-for-Service Lathes are noted for their power and rigidity. Take deep cuts through toughest metal without pause or chatter.



Specifications include 3-step cone, double back gear, semi-quick change gear lathe, built on 10 ft. bed. This lathe also furnished with quick-change gears. Bed lengths available: 10, 12, 14, 16, 18 and 20 feet.

The Sidney Line comprises 15-inch, 17-inch, 19-inch, 25-inch, 27-inch, 30-inch and 36-inch lathes, which are adaptable to the finest tool room work or the heaviest duty shipyard or factory rapid production work.

**The Sidney Tool Company, Sidney, Ohio**

Canadian Agents: The Geo. F. Foss Machinery & Supply Co., Montreal, Quebec. H. W. Petrie, Limited, Toronto, Ontario.

## WONDER

"Bending  
Machines"



DON'T WASTE ELBOWS

### BEND PIPE COLD

**ELIMINATE FRICTION**

New Models

"Wonder" Pipe and Tube Bending Machines (pat.) electrically operated to bend from 1" to 18".

We also manufacture  
10 other sizes

Hand operated to bend from 1/8" to 8".

**American Pipe Bending  
Machine Company**

52 Pearl Street  
BOSTON, MASS. U. S. A.

## THE ST. LAWRENCE WELDING CO.

LTD.

MONTREAL, QUE.

A. M. BARRY, Managing Director

Office and Works:

138-140 Inspector Street

Telephone Service:

(Long Distance) Main 5779 and at Night, Westmount 3483

Maritime Branch:

HALIFAX, N.S.

**CONSULTING ENGINEERS** on all kinds of welding.

**BREAKDOWN REPAIRS** handled at once; just 'phone us and we will be on the job by next train.

**OXY-ACETYLENE WELDING** of heavy cast iron frames, cylinders, gears, water wheels, etc.

**STEEL**, any kind of welding on parts of large or small machines, tanks, digesters, boilers, shafts, brackets, etc.

Can be welded in place when necessary.

**ELECTRIC WELDING** on boilers, digesters, leaking tanks, etc.

**MARINE REPAIRS** undertaken by our Marine Welding Tug which is equipped with Electric and Oxy-Acetylene Welding Apparatus with Compressed Air Plant complete.

**OXY-ACETYLENE CUTTING** of any kind of steel construction.

**PORTABLE WELDING APPARATUS** of all kinds with skilled operators always available to repair your breakdown at once.

**THERMIT WELDING** on all classes of work is a special feature of present activities.

**Manufacturers of Steel Tanks, Air Receivers, Welded Tanks, etc.; Electric Welders, Oxy-Acetylene Welders, Boiler Repairs, Lead Burning and Thermit Welding.**



# It's an "OLIVER"

World Renowned  
for High Quality



## "Oliver" 26-inch Extra Heavy Duty Engine Lathe

turning face on 24-inch  
steel disc and drilling  
3-inch hole in the centre

The power and rigidity of the "Oliver" will enable you to get the full cutting power of your high speed steel.

WE ALSO MAKE TURRET LATHES, SCREW MACHINES, SPEED LATHES, DIE FILING MACHINES.

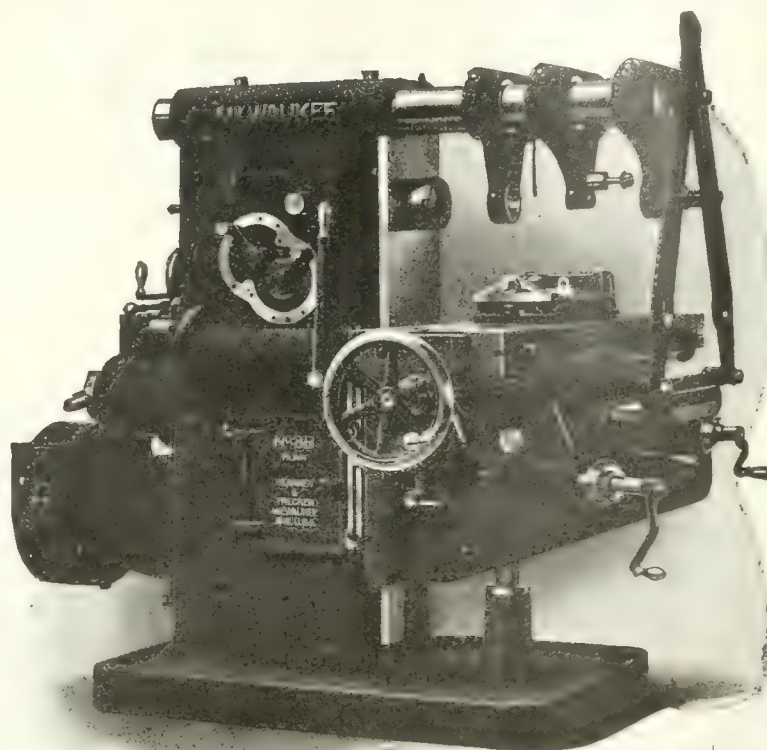
May we send you Descriptive Bulletins?

**OLIVER MACHINERY COMPANY**  
**GRAND RAPIDS** **MICHIGAN, U.S.A.**

European Offices: Manchester, England; Paris, France.

*If interested tear out this page and place with letters to be answered.*





## MILWAUKEE MILLING MACHINES

### Double Overarm maintains alignment.

It is impossible for the operator to place the arbor supports on the arbor and double overarm in any other way than in line. Arbor cannot be pounded out of line when using large, coarse pitch cutters on rough, heavy work.

### Other Distinctive Milwaukee Features:

Solid top knee—hardened steel gearing and shafts in the column and feed box—automatic flooded lubrication—one and one-half gallons of oil per minute pouring over all gears and bearings in the column and feed box, insuring lubrication at all times—flanged spindle with hardened steel collar for driving arbors—constant speed drive, reverse being self-contained.

*Send for our No. 21 Catalogue. Illustrating and describing Milwaukee Milling Machines and accessories in detail*

**KEARNEY & TRECKER CO.**  
MILWAUKEE, WIS. U.S.A.

# A Plant Equipped in Every Detail to Suit Your Every Need



## STEEL PRODUCTS

Open Hearth, Basic and Acid, Electric and Alloy Steels.

## CASTINGS

For Ships, Railways, Rolling Mills, Gears, Machinery and Ingots to 35 tons.

## RAILWAY SPECIALTIES

Penn Couplers, Bolsters, Truck Side Frames, Draft Gears.

## FORGINGS AND BILLETS

Heavy Ship Forgings, Locomotive and Car Axles, Miscellaneous Forgings.

## PLATES

Plates and Heavy Sheets to 30 inches wide, Soft and High Carbon, Automobile Plates and Sheets.

## AGRICULTURAL STEEL

Soft Centre and Solid Plow Steel, Harrow Discs, Shovel Steel, Cultivator Blades.

**DOMINION FOUNDRIES AND STEEL, LIMITED**  
HAMILTON, CANADA

# Wire Cloth

*of every description*



We make Machinery  
Guards of all kinds.

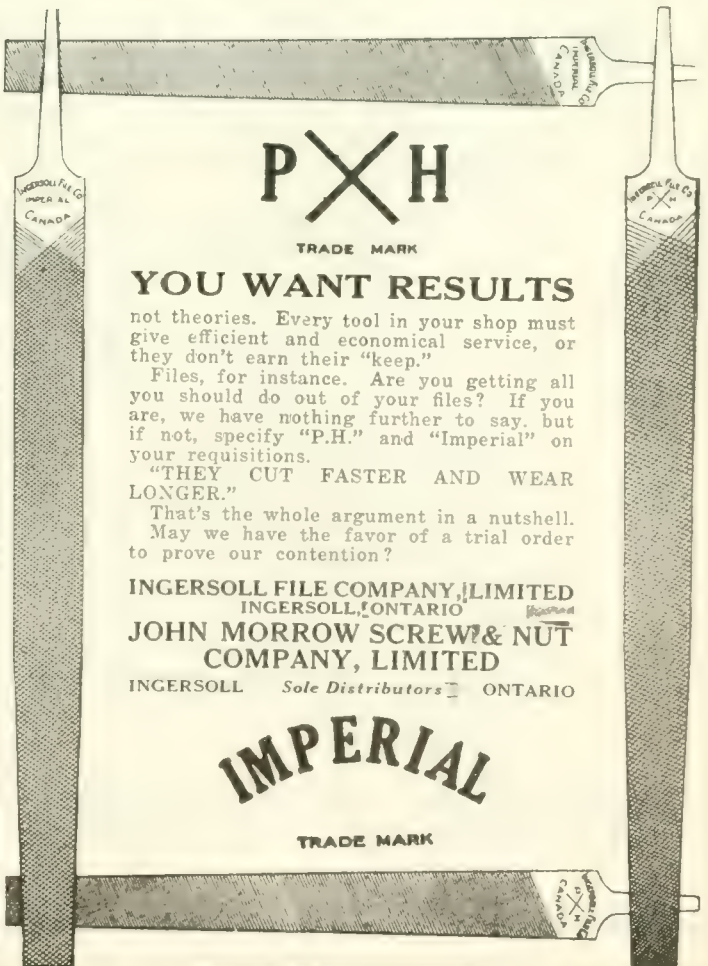
Metal Lockers for Clothes.

Overhead Wire Guards for  
Elevators.

Drop a line for full details.

**Canada Wire & Iron  
Goods Company**  
Hamilton, Ontario

Eastern Representative:  
H. E. O. Bull, 184 Mance  
St., Montreal, Que.



**P X H**  
TRADE MARK

**YOU WANT RESULTS**  
not theories. Every tool in your shop must give efficient and economical service, or they don't earn their "keep."  
Files, for instance. Are you getting all you should out of your files? If you are, we have nothing further to say, but if not, specify "P.H." and "Imperial" on your requisitions.  
"THEY CUT FASTER AND WEAR LONGER."  
That's the whole argument in a nutshell. May we have the favor of a trial order to prove our contention?

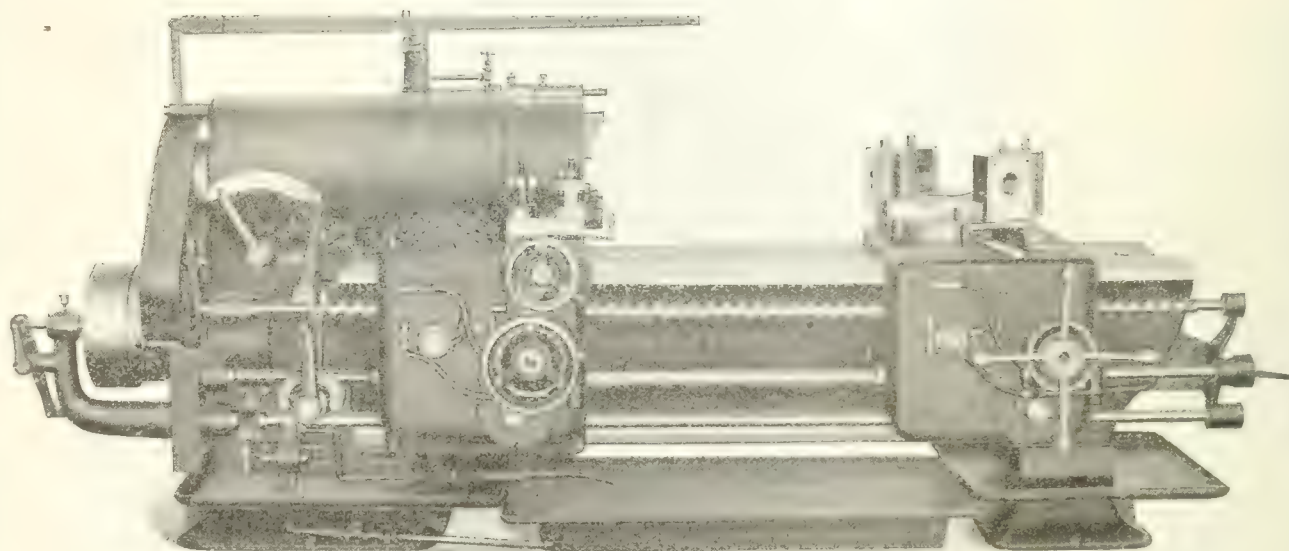
**INGERSOLL FILE COMPANY, LIMITED**  
INGERSOLL, ONTARIO  
**JOHN MORROW SCREW & NUT COMPANY, LIMITED**  
INGERSOLL Sole Distributors ONTARIO

**IMPERIAL**  
TRADE MARK

*If interested tear out this page and place with letters to be answered.*



# STEINLE



Still another reason why the Steinle 24" Full Swing Side Carriage Turret Lathe is ahead of all others in the economical and accurate production of many classes of work.

## THE COMBINATION TURRET

In designing this turret the following points were taken into careful consideration:

**The proper manner of supporting different kinds of tool equipment required on a machine of this character.**

**Avoidance of excessive tool overhang.**

**Ability to secure the full benefit of the side carriage in relation to the absence of turret tool overhang.**

As regularly furnished, the combination turret is hexagon in form, 21" in diameter, and has two open sides and four bored faces. The open sides permit of universal facing heads or similar tool equipment being firmly secured to the bed of the turret and provide for suitable adjustment of tools to the work with a minimum overhang. The bored faces carry drills, boring bars, reamers, die heads, taps, etc.

The combination turret has power traverse and quick change reversible longitudinal feed controlled from the apron.

The bearing on the saddle is the full diameter of the turret. The locking pin is located in front, the greatest possible distance from king pin. One motion of the binding lever releases the pin and turret, or binds same.

The design of the combination turret secures the full advantage of the side carriage feature.

## STEINLE TURRET MACHINE CO.

MADISON

- - - WISCONSIN, U.S.A.

# Economy A Big Factor In "HISCO" Moulded Gears

In the installation of new machinery in the working out of new processes—you may require gears or sets of gears, and no matter what the diameter, the Hisco process relieves you of the necessity of having patterns made—entailing considerable cost and delay.



"HISCO" machine moulded gears, while requiring no pattern, insure accuracy, dependability, quality, and the price is minus the cost of patterns—which in these days of high lumber and wages, and when time is a factor—is something to be considered.

The "HISCO" plant is equipped to produce machine moulded gears up to 18 feet in diameter without patterns—and remember, very often the pattern has cost more than the gears.

**HULL IRON & STEEL FOUNDRIES, LIMITED**  
HULL, CANADA

# SURPLUS PRESSES

## USED IN MUNITION WORKS

# FOR SALE

**Heavy Bliss and Toledo Toggle, Crank  
and Rack and Pinion Presses**

*Send for Detailed List and Prices.*

**The Canadian Cartridge Co., Limited**  
HAMILTON                    ∴                    ∴                    CANADA



# Wherever Pipe is Cut or Threaded Economically

The probability is two to one that it's a

**Williams** Pipe Machine

that's on the job.

For in approximately two-thirds of all the larger plants in this country Williams' Pipe Machines are used.

It was the Williams Pipe Machine that brought highest honors home from the Panama Exposition.

The Machine illustrated has a capacity of 21½" to 12". Also nine other sizes to meet your requirements.

Write

**Williams Tool Company**

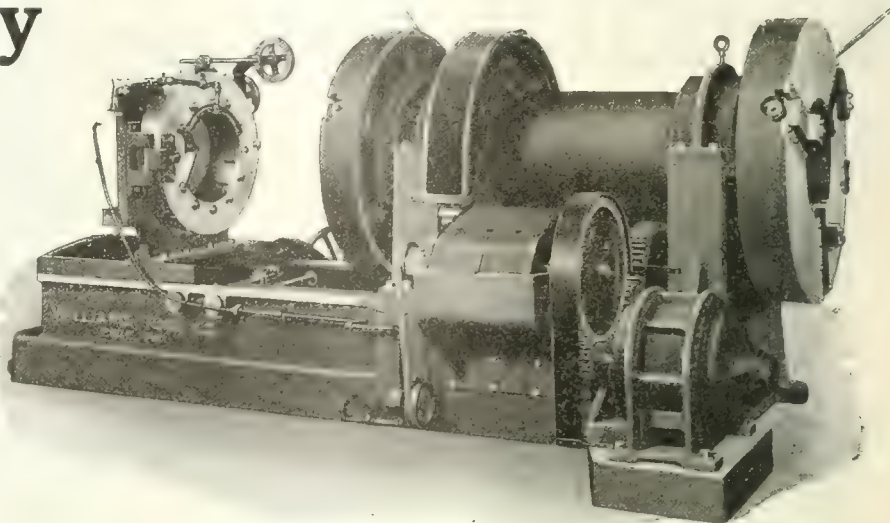
Erie

-

Penn.

-

U.S.A.



Canadian Agents:

The A. R. Williams Machinery Co., Limited, Toronto, Canada

European Agents:

Universal Machinery Corp. London - England



## "The Marshalltown Throatless Shears"

guarantees perfect work at less than half the ordinary expense.

Rotary, self-feeding shears designed for cutting in and out curves, straight or irregular shearing, circles, also beveling and splitting of plates. Built in various sizes having capacities from tin up to ½" thick. No limit to the size of sheet being cut. Hand, belt or motor drives. The last word in metal cutting shears. We also manufacture Rotary Bevel Shears, Splitting Shears and Plate Milling Machines.

Let us know your requirements.

**Marshalltown Mfg. Co.**

Marshalltown, Iowa

U. S. A.

# The *Greenfield* Universal Grinder

For General Tool Room Work

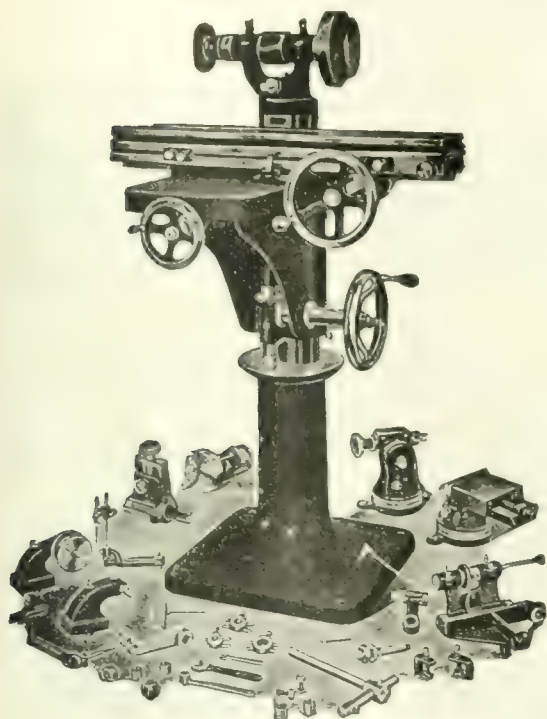
This grinder is furnished with attachments for grinding all sorts of milling cutters, reamers, counterbores, and other machine shop tools.

It is also suitable for cylindrical, internal and flat work which frequently turns up in the making of tools and jigs.

These attachments are all very simple in design and easily adjusted upon the machine, being graduated so that any desired angles can be at once obtained.

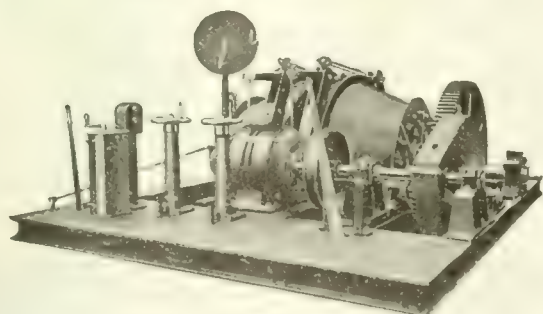
The whole machine is thoroughly well built, well finished, and will be found a dependable, convenient grinder.

**Greenfield Machine Company,  
GREENFIELD, MASS., U.S.A.**



## LANCASHIRE MOTORS

HAVE WORLD WIDE REPUTATION  
FOR  
"RELIABILITY"



MOTOR DRIVING MINE HOIST

Specialists in Motor  
Manufacture and Application

SEND YOUR ENQUIRIES TO

**The Lancashire Dynamo & Motor Co.,  
of Canada, Limited**

Head Office and Works  
45 NIAGARA ST.  
TORONTO

Branch Office  
602 NEW BIRKS BLDG.  
MONTREAL

## Clothing Protection as Necessary as Machine Guards PROTEXAL CLOTHING



is safe and comfortable. Extra patented fasteners at wrists and ankles permit garments being more tightly fastened and safeguard the wearer from being caught in machinery; this feature alone helped make Protexal clothing popular.

### No Clothing like it Marketed

Made of high-grade, closely woven, especially treated duck material to resist fire, water or acid; will outwear overall or other work-cloth.

### GARMENTS STAMPED "PROTEXAL"

are backed by our guarantee. A movement for every industrial need. Protexal clothing is as popular as our.

### ADJUSTOGLAS PROTECTION GOOGLES

for carpenters, joiners and woodmen.

Protectal Hose and Goggles Catalogue No. 1 now ready. We carry a complete line of safety appliances.

**The Strong-Kennard & Nutt Co.**

Safety, First-Aid and Welfare Equipment  
2044 E. 9th St. Cleveland, O.

Jobbers and Dealers Wanted. Write Early. Advertising Campaign.

EXHIBITORS AT SAFETY CONVENTION, GRAYS ARMOY, CLEVELAND, OHIO, OCTOBER 1-4, BOOTHS 1-3-5B.



## 24 Cubic Inches of Steel Removed Without Braces



The Rectangular Overarm enables the new No. 5 Cincinnati Miller to take cuts up to its normal rated capacity without the use of braces. Ask for catalog.

Cut  $\frac{1}{4}$ " deep, 5" wide, feed 19" per minute, removing  $23\frac{3}{4}$  cubic inches of steel per minute, without the use of braces.

Material Machinery steel; cutter  $4\frac{1}{2}$ " diameter, Cincinnati designed spiral mill 2" arbor.

*Patent Rights Fully Reserved*

**THE CINCINNATI MILLING MACHINE COMPANY**  
CINCINNATI, OHIO

## The "PINK" Line Logging Tools and Handles



**MADE-IN-CANADA Products---Headquarters for British Empire for all Lumbering Tools**

In every lumber camp in Canada you'll find PINK'S famous lumbering tools. They are the favorites there and have won the esteem of all woodsmen through their superior merit. They are world-renowned and are extensively used in Australia, New Zealand and other countries where the lumbering industry thrives.

**EXPORTERS TO EUROPE**

We export the same good quality of lumbering tools that have made PINK'S TOOLS a by-word in the matter of good tools in all Canadian lumber camps. Enquiries cordially solicited.

**Thomas Pink Co., Limited**  
PEMBROKE, ONT., CANADA

# SIMONDS

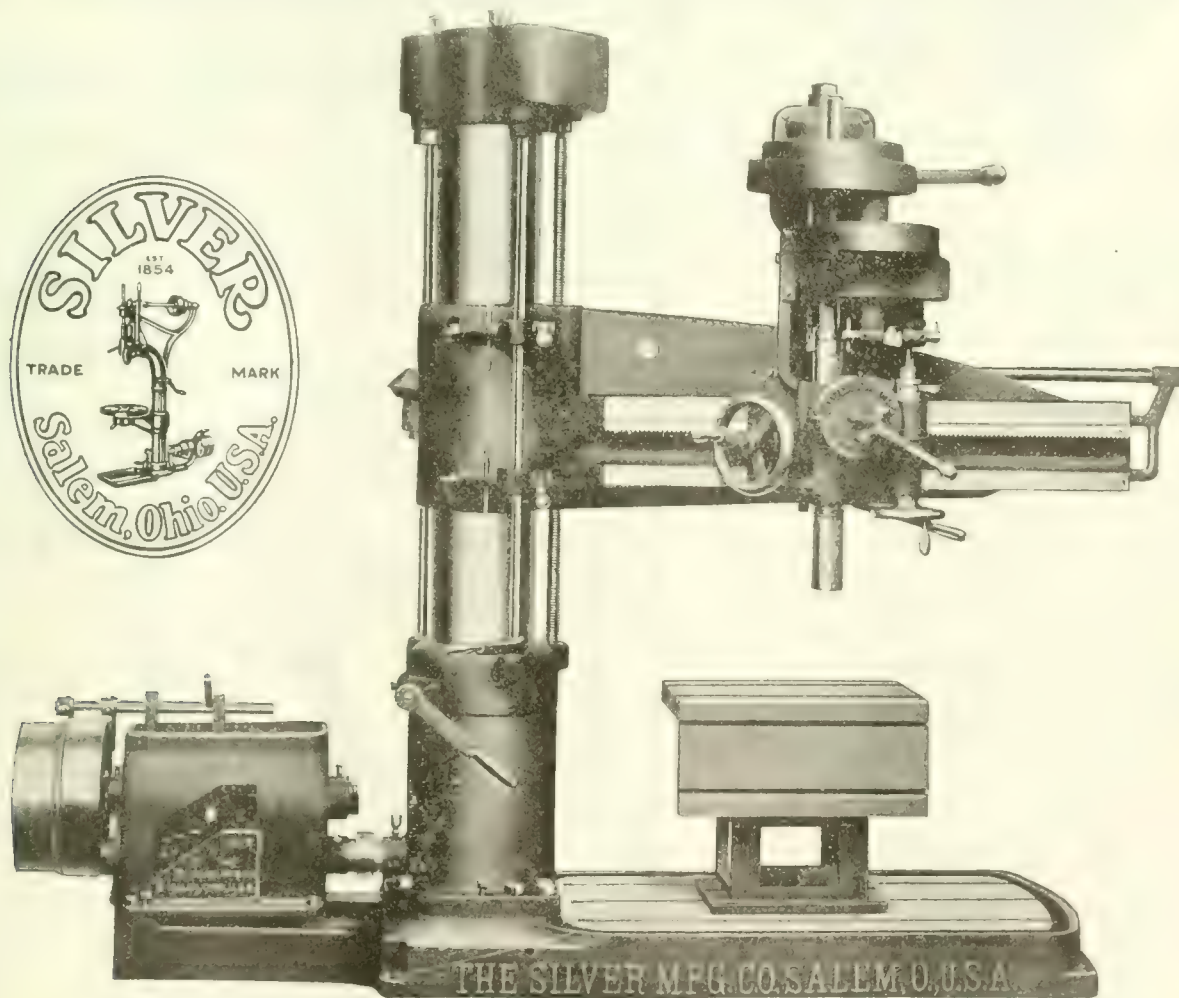
## HACK SAW BLADES

UNEQUALED IN QUALITY ANY SIZE OR LENGTH

Simonds Canada Saw Co. Limited  
ST. JOHN MONTREAL VANCOUVER

# ANNOUNCING Silver Radials

After sixty-five years of successful drill manufacturing experience—four years of experimental work, exhaustive tests and investigation of the requirements and possibilities of radial drills, we are putting on the market the new Silver Radials. They embody principles and incorporate many patentable features not found on other drills.



Built in 2½, 3 and 3½-foot sizes.

Read announcement and description elsewhere in this issue of Canadian Machinery and drop a line for attractive descriptive folder in colors.

**THE SILVER MANUFACTURING CO.**  
Box 290, Salem, Ohio, U.S.A.

FOUNDED 1854

LONDON

PARIS

BRUSSELS

NEW YORK

GENOA

SIDNEY

CAPE TOWN

Silver Radials are made by the builders of the famous Silver line of 20 and 25 inch drills.

*If interested tear out this page and place with letters to be answered.*





## Your Money's Worth

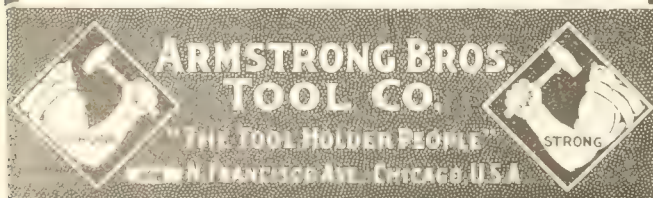
Never again will the Canadian Nation and People be the same careless improvident spenders of "ante bellum" days. "EFFICIENCY" and "GET YOUR MONEY'S WORTH" will be the popular motto and the successful machine shop manager must be able to see the advantage of making one pound of High Speed Tool Steel do the same work as ten pounds in forged tools; in other words he must and will

## USE ARMSTRONG TOOL HOLDERS

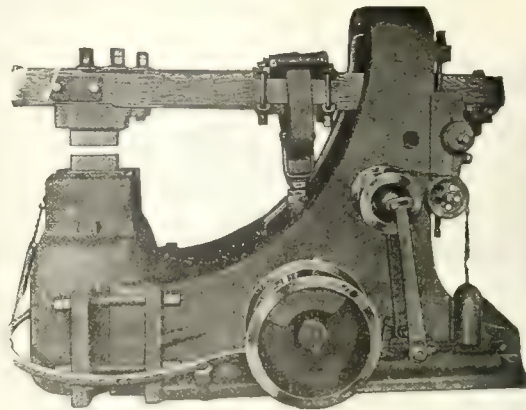
No heavy "stub-ends" to throw away. No time lost with men at the grinder while lathes stand idle. No stock of heavy sizes of steel to carry, and the blacksmith as a tool-dresser is eliminated entirely.

Armstrong Tools are great favorites with the men—a good thing to consider from a production standpoint.

*Our Catalogue is of handy pocket size and will be mailed to you upon request*



## Strike While the Iron's Hot



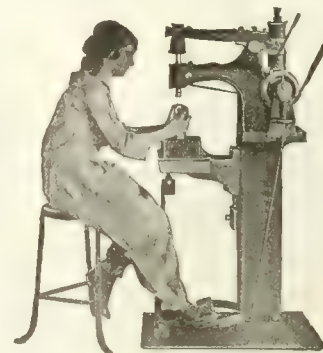
Send  
For  
Our  
Helve  
Hammer  
Book  
Now

## The Rochester Helve Hammer

Any blow, long or short, fast or slow, heavy or light—any length, weight and force of blow instantly secured on the Rochester "Helve" while the machine is running. This feature alone saves so much time where there is a variety of small work to be forged, swaged or welded, that it recommends the tool without reference to its other distinctive features. Made in 6 sizes, 2 styles of frames; 25-lb. to 100-lb. heads. For Welding and General Forging the "Rochester" is peerless in efficiency. Get our Helve Hammer Book.

**THE WEST TIRE SETTER CO.**  
ROCHESTER, N. Y.

## The Hammer With The Human Stroke



## HEADS RIVETS COLD

Heads 'em tight or loose, flush, countersunk, or finishes heads any shape desired, and at the rate of:—

A rivet a second, sizes up to 3/16".

A rivet in two seconds, size 1/4" to 5/8".

A rivet in three seconds, size 7/16" to 3/4".

And on special order we build machines to handle rivets up to 1 1/4" with proportionate rapidity.

Built in eight sizes.

Besides riveting, the High Speed Riveting Hammer does all kinds of peining, swaging, upsetting, etc.

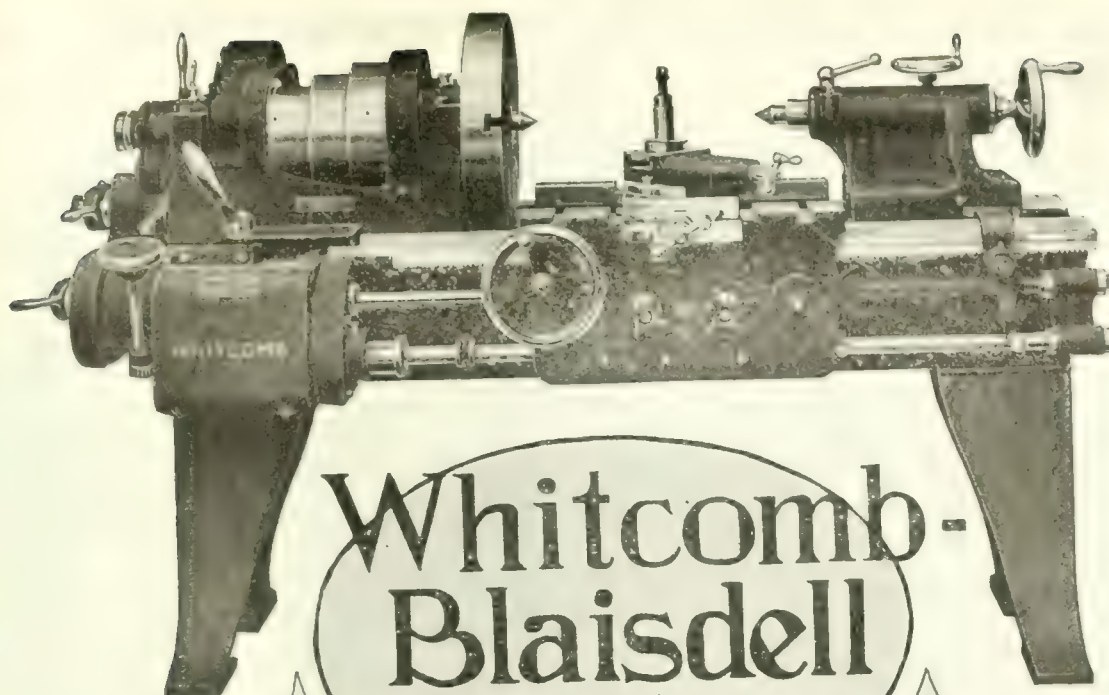
Send us sample assembly parts with rivets or sketch of your work,

and

Let us shoulder your riveting problems.

Send for the High Speed Hammer Book.

**THE HIGH SPEED HAMMER COMPANY, INC.**  
ROCHESTER, N. Y.



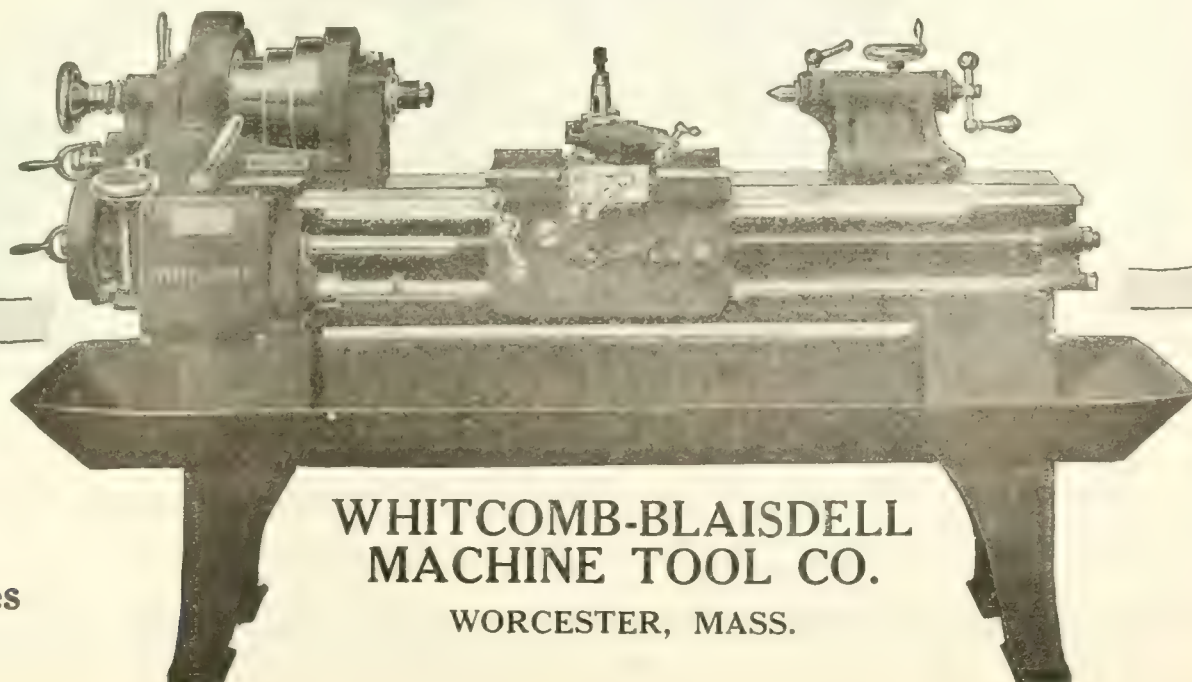
# Whitcomb- Blaisdell Lathes

**P**OWERFUL, WELL-BALANCED MACHINES THAT ARE LIGHT-RUNNING AND ADAPTED TO ALL CLASSES OF RAPID MANUFACTURING.

Every feature of the W-B Lathe of to-day has been considered from the viewpoint of greatest utility. Materials used embody toughness and durability. Our tests must prove great wearing quality and strength before any material is selected.

The product of an organization that has for sixty years been distinguished for the superior design, workmanship and material of its product

Write for our latest catalog describing all of the good features of Whitcomb-Blaisdell Lathes



**WHITCOMB-BLAISDELL  
MACHINE TOOL CO.**

WORCESTER, MASS.

**Lathes**



## Customers Are Satisfied

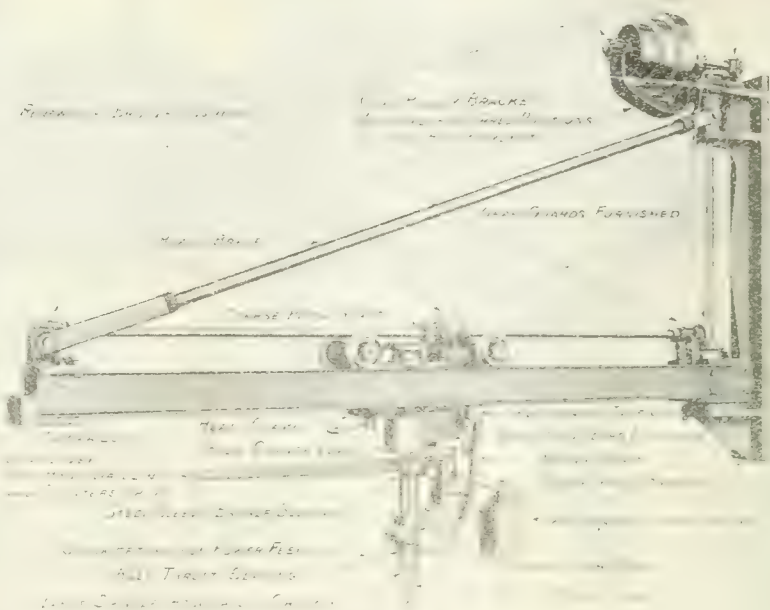
with the performance of this machine in their works. A recent letter to us states: "Regarding the WALL RADIAL DRILL, this is operating every day, and we are more than pleased with the results we are getting from the use of this tool. In all probability we will install additional ones later on." Our deliveries are getting further away each day. Better take advantage of the present conditions.

Want our detailed bulletin? You'll be interested in noting the construction of this machine, as given in same.

### MADE IN FOUR STANDARD SIZES.

Rated size	Drills to centre of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

F.O.B. Boston, Mass.



## LYND-FARQUHAR COMPANY

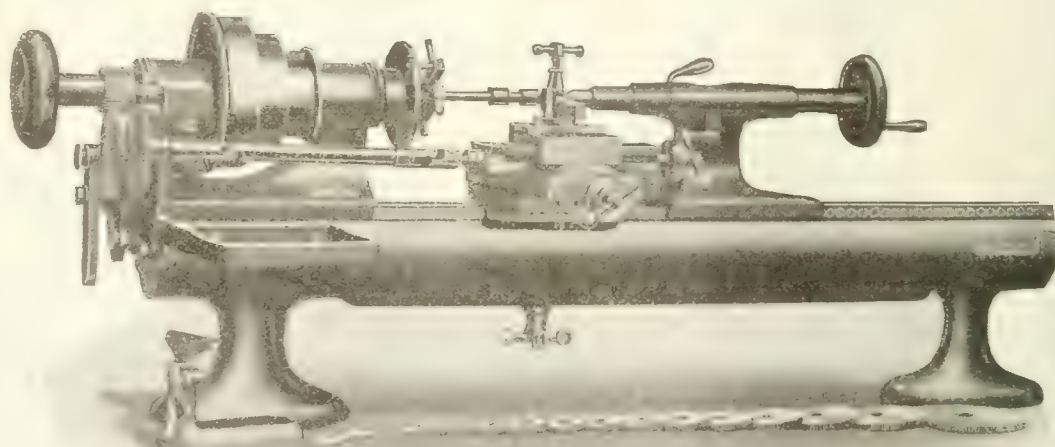
419-425 Atlantic Avenue

Dept. B

BOSTON, MASS.

## CATARACT BENCH LATHES AND ATTACHMENTS

Cataract Bench Lathes are finely constructed precision tools, with responsive controls, simple adjustments and numerous convenient attachments adapting them to a wide variety of work. Study this illustration. Note the base, the circular bed, the sliding tool post, massive head stock (indicating strength), range of gears, special tailstock, arrangement of gears.



**Hardinge Bros., 1770 Bertau Avenue, Chicago, Ill.**

ALFRED HERBERT CO., Limited, Coventry, England, are our representatives for United Kingdom, France, Belgium, Russia, Japan, Manchuria, Korea, Formosa, China, Italy.

# Photographic Copying The PHOTOSTAT

(Trade Mark Registered)

"Orders are now delivered three or four days earlier to our customers by making photographic copies of sketches and drawings which are the same in every detail instead of having our draftsmen reproduce the original.

"Practically all orders were previously held up three or four days by our drafting department while copies of the intricate drawings of ordered tools were being made. Now with the Photostat, only 15 or 20 minutes are required to make the three copies, exact duplicates of the original, which the factory needs to turn out the order. By eliminating this needless delay we are able to provide better service for our customers, and attract new prospects because of prompt deliveries."



This cut shows a PHOTOSTAT on which a large drawing has just been copied in less than a minute.

## Never Makes a Mistake

It is simple, practical, easy to handle. Requires no expert knowledge. The machine is loaded with a roll of sensitized paper especially manufactured for the purpose.

The original subject is photographed directly upon this paper producing a facsimile copy which is immediately cut off, developed and fixed right in the PHOTOSTAT itself.

The focusing, exposing and developing are all controlled by simple mechanical devices and no glass plate, film or other intermediate negative has to be made.

After fixing, the copy is removed to a tank of running water and rapidly washed free from chemicals. It is then dried and is ready for use. As many copies as desired may be run off in this manner.

By a simple adjustment of the mechanical focusing device the copy may be made at actual size, reduced, or enlarged, within the size limitations of the machine.

*Error in copy is impossible because every copy is an absolute facsimile. The operations are all simple, such as a boy or girl can do.*

## The PHOTOSTAT Copies

Pencil Drawings,	Ink Drawings,
Tracings,	Reports
Shipping Lists,	Data Sheets,
Contracts,	Ledger Pages,
Illustrations for Salesmen,	Insurance Records,
Sketches,	Blue Prints,
Specifications,	Maps,
Legal Documents,	Graphs,
Cuts and Drawings for Advertising, etc.	

Manufactured by the Eastman Kodak Company exclusively for the

# COMMERCIAL CAMERA COMPANY

343 STATE STREET, ROCHESTER, N. Y.

CHICAGO

NEW YORK CITY

PHILADELPHIA

PROVIDENCE

WASHINGTON

### AGENCIES:

Alfred Herbert, Ltd., Coventry, England  
Societe Anonyme Alfred Herbert, Paris, France  
Societa Anonima Italiana Alfred Herbert, Milano, Italy  
Graham Brothers, Stockholm, Sweden





Just Try These-They're  
**CLEVELAND**


THE CLEVELAND TWIST DRILL CO., Cleveland, New York, Chicago

Agents for Europe, CLEVELAND TWIST DRILL CO. (GREAT BRITAIN), Ltd., 36-37 Upper Thames St., London E.C.4.



Listen, Old Man,  
Why don't you use

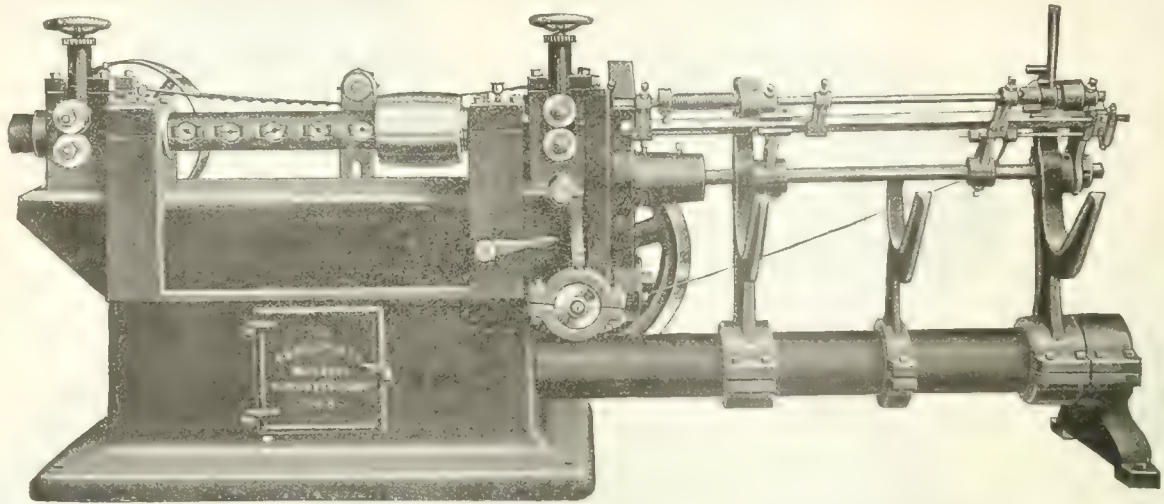
**CLEVELAND**


 A detailed illustration of a Cleveland Twist Drill bit, showing the flutes and the handle. The bit is positioned horizontally across the word 'CLEVELAND'.

THE CLEVELAND TWIST DRILL CO., Cleveland, New York, Chicago

Agents for Europe, CLEVELAND TWIST DRILL CO. (GREAT BRITAIN), Ltd., 36-37 Upper Thames St., London E.C.4.





## Perfect Wire Straightening Quickly and Profitably Done on Our Automatic Wire Straightening and Cutting Machine

Just put your coil of wire on the reel, adjust the rolls and dies, and set the gauge for the length you want. The machine does the rest—thousands of feet per day, perfectly straight and cut to accurate lengths.

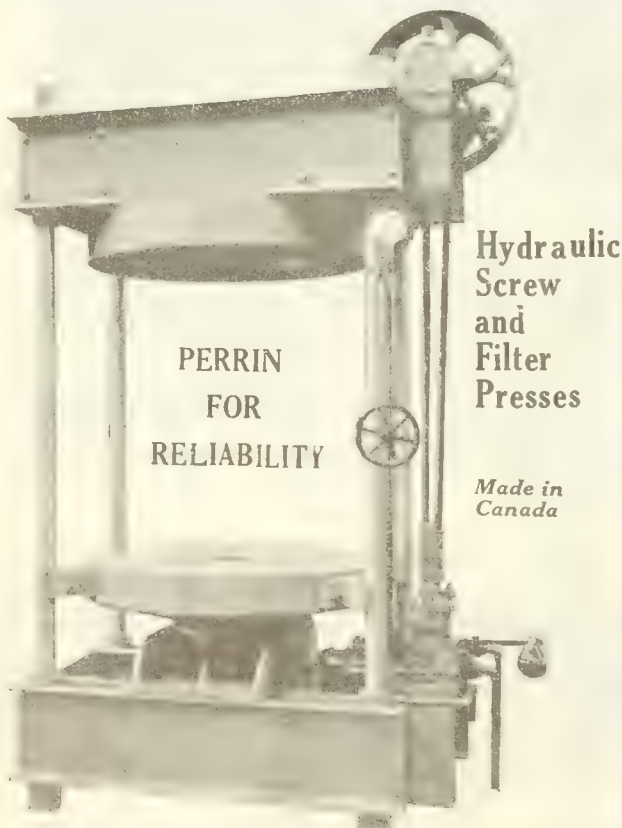
Catalogue tells more about them, and we will be glad to send you a copy.

### THE F. B. SHUSTER CO., New Haven, Conn.

FORMERLY JOHN ADT & SON

ESTABLISHED 1886

ALSO MAKERS OF STRAIGHTENERS FOR SQUARES, HEXAGONS, FLATS, ETC.



PERRIN  
FOR  
RELIABILITY

Hydraulic  
Screw  
and  
Filter  
Presses

Made in  
Canada

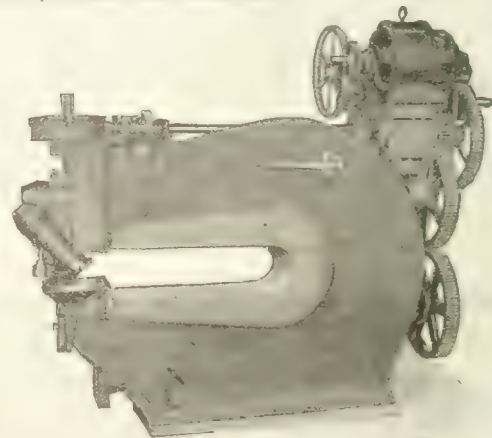
Hydraulic Truck Tire Press  
**WILLIAM PERRIN LIMITED**  
TORONTO

"QUICKWORK"  
Registered in U.S. and Foreign Countries.

## ROTARY SHEARS

MADE IN 7 SIZES.

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



Patented June 1st, 1913

**SAVES 50% TO 90%**

Eliminates Oxyacetylene Cutting and Plate Planing.

Write for Catalogue No. 60.

**THE QUICKWORK COMPANY, ST. MARYS, OHIO, U. S. A.**

Cable address: "QUICKWORK."

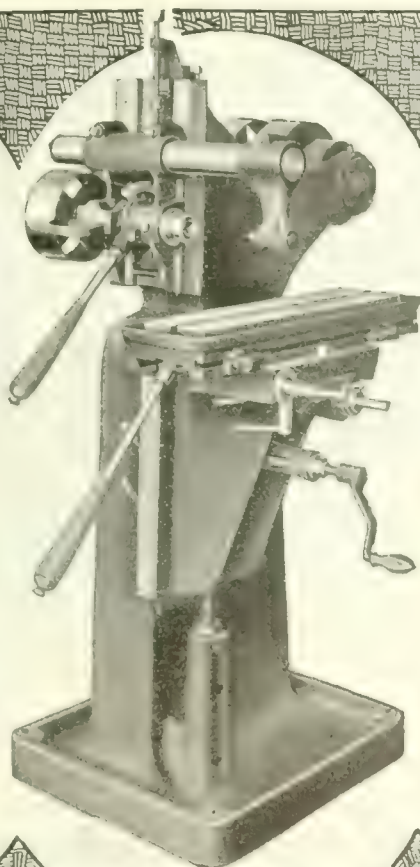
Codes: W. U. and General.

## The "BRISTOL" Hand Milling Machine

Extensively used in the manufacture of small parts where accurate duplication is essential. Illustration shows our number 1 Heavy Type Hand Miller.

Specially designed for use on work where heavier machine than standard type is necessary.

**BRISTOL**



## Convenience Assures Big Production

The lever controls make a very convenient method of operation, though crank is furnished for table feed for use when so desired.

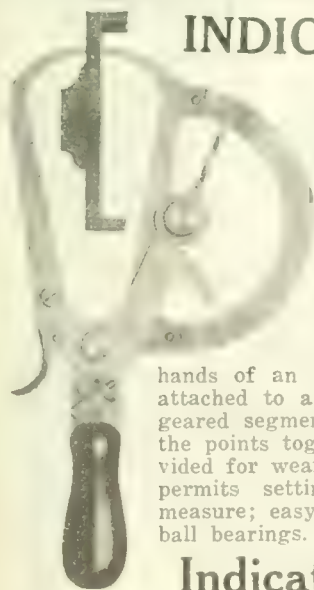
Users acknowledge these machines to be exceptional producers, proving in many cases more satisfactory than milling machines of the more expensive type.

Write for catalogue.

**BRISTOL**

**The Bristol Machine Tool Co., Bristol, Connecticut**

## INDICATING CALIPERS



This finely made tool, of the simplest construction, incorporating features of outside calipers, rule, magnifier, and indicator, is accurate, easily read and manipulated with one hand. Great saving of time is effected in the

hands of an interested user. A hand attached to a pinion is actuated by a geared segment; a coiled spring draws the points together; adjustment is provided for wear of parts; locking device permits setting of tool to required measure; easy movement is effected by ball bearings.

## Indicating Calipers

are used by

MACHINISTS, PATTERN, TOOL and MODEL MAKERS.

**\$8.75** 3" Graduated in 64th inches. Scale enlarges two times. 2" Graduated in 100th inches. Scale enlarges three times.

Write for folder or make inquiries thru local dealer.

MADE EXCLUSIVELY BY THE  
**INDICATING CALIPERS CO.**

506 East 19th St., New York

Stocked by Exclusive Canadian Agents:  
Williams & Wilson Limited, 84 Inspector Street, Montreal, Que.

## Wood Screw Making Machinery

SEND FOR CATALOGUE  
Series B6



For sixty years we have constantly manufactured machinery for making screws, always studying to improve and refine our product.

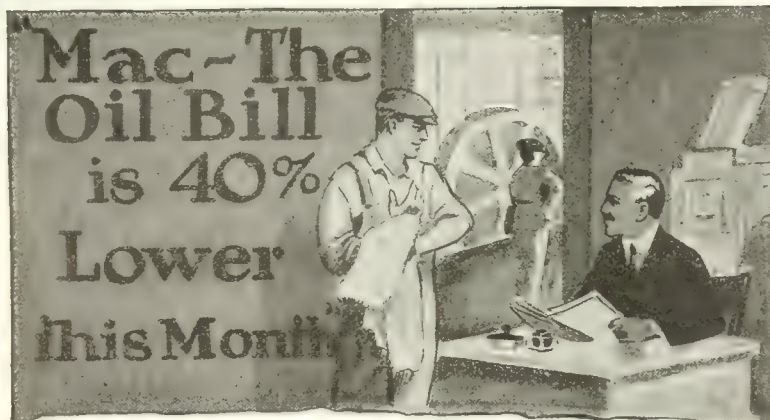
Write or Wire us.

Cable address: "Cook,"  
Hartford, U.S.A.

Codes: Liebers  
Western Union

**Asa S. Cook Co.**  
**Hartford, Conn.**





**"Mac - The  
Oil Bill  
is 40%  
Lower  
this Month"**

"Yes, sir, and there's a good reason for it too. Since we installed the BOWSER Oil Filtering Outfit the men in the engine room have been competing to see who could save the most oil. They've cleaned the journal boxes, put pans under them to catch the drips and then put the salvage through the BOWSER Oil Filtering Outfit. We are now using the oil over and over again that was formerly wasted."

The BOWSER Oil Filtering Outfit is simple, compact, economical and reliable.

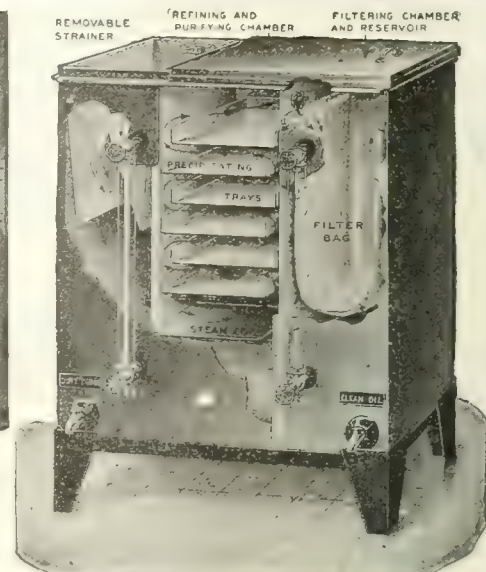
WRITE FOR LITERATURE DESCRIBING OIL FILTERING SYSTEMS SUITABLE FOR YOUR POWER PLANT.

LONDON  
32 Victoria St., S. W. 1  
HAVANA  
Lonja del Comercio 427

**S. F. BOWSER CO., Limited**

**66-68 Frazer Avenue, TORONTO, ONT.**

PARIS  
5 Rue Denis-Poissons  
SYDNEY  
6 Castlereagh St.



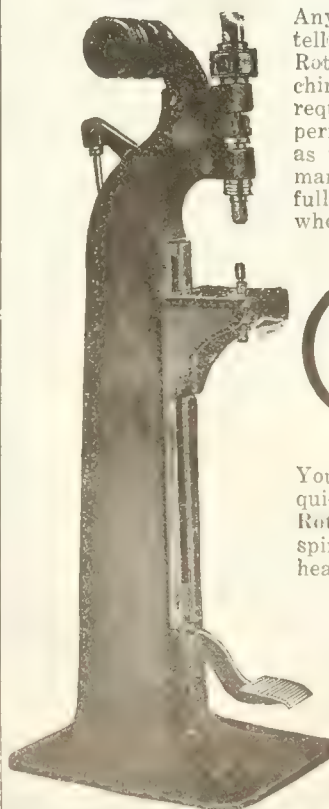
### Bowser 7F Oil Filter

First, means a cleaner engine room.

Second, it cuts your lubricating oil bill considerably.

Third, IT PAYS FOR ITSELF over and over.

## No Skill Required



Anybody with ordinary intelligence can operate this Rotary Rivet Spinning Machine. No special skill is required. It is a tool that perfectly fits labor conditions as they exist to-day. A woman could operate as successfully as the skilled mechanic who went to the front.

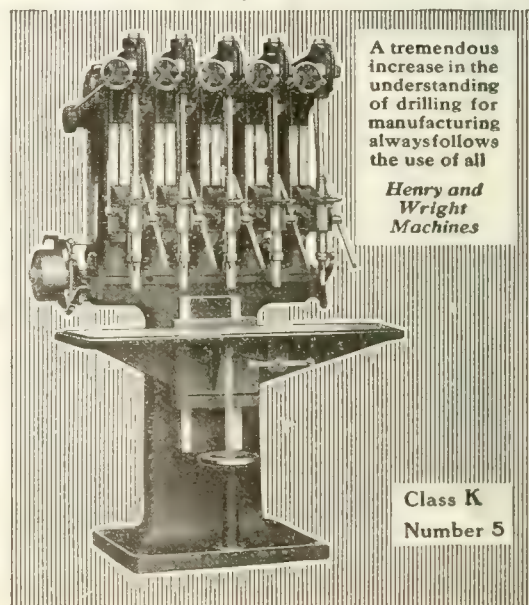
The  
**GRANT**  
is Noiseless

You are assured of perfect quietness wherever the Grant Rotary is running. And it spins a perfect polished rivet head every second without breaking or marring the casting. Rivets tight or loose. Write for details.

**The Grant Mfg. and  
Machine Company**

HOLLAND AVE.  
Bridgeport, Conn., U.S.A.

## HENRY & WRIGHT Drilling Machines



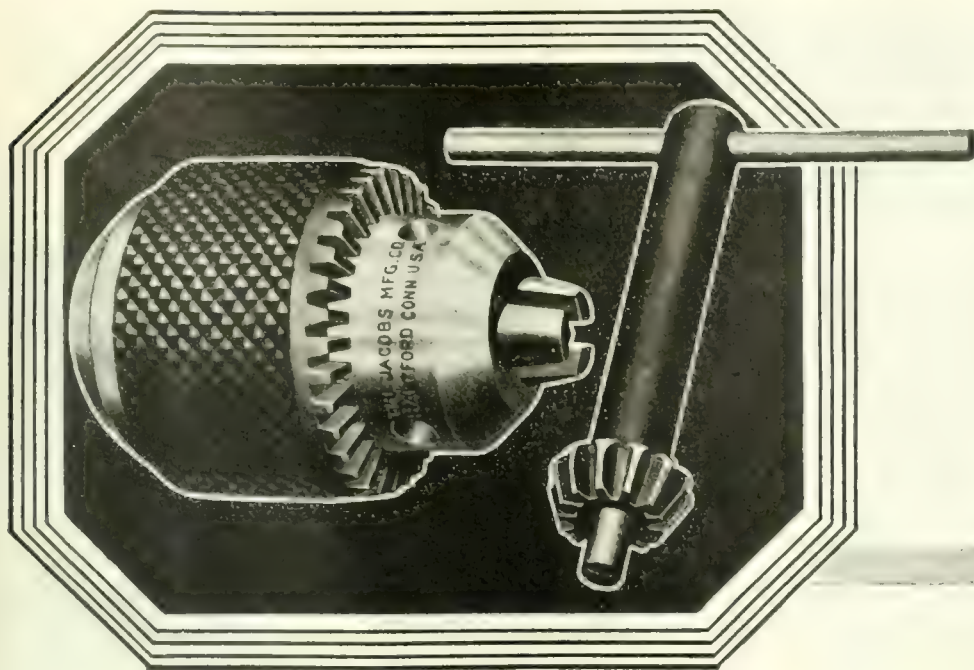
A tremendous increase in the understanding of drilling for manufacturing always follows the use of all

*Henry and  
Wright  
Machines*

**Class K  
Number 5**

**The Henry & Wright Mfg. Co.**  
Hartford, Conn.

Canadian Fairbanks-Morse Co., Montreal, Toronto, Winnipeg;  
A. R. Williams Machinery Co., Toronto, St. John, N.B.;  
H. W. Petrie, Ltd., Toronto; Williams & Wilson, Montreal;  
Rudel-Belnap Machinery Co., Montreal; Canada Machinery  
Corp., Galt, Ont.; Geo. F. Foss Machinery & Supply Co.,  
Montreal; General Supply Co., Montreal.



## On the Job All the Time

Jacobs Improved Drill Chucks are standard equipment in the largest, most representative shops and factories throughout the world.

When other chucks have been retired, Jacobs Improved Drill Chucks have been hired, and have retained their places because of their unfailing, unequalled service where equipment must pay its own way.

The workmen know the value of good chucks. Jacobs Improved Drill Chucks are recommended by them as savers of drills and savers of time.

6 different models in  
12 styles ranging from  
13/64" to 1".

**THE JACOBS MFG. CO.**

DEPT. C. M.

**HARTFORD — CONN.**





# RICKERT-SHAFER TAPPERS

The *smooth drive* reduces the strain on the taps—they wear longer—and there are fewer delays from taps breaking in the work.

*R-S Tappers ensure faster tapping and quicker assembling.*

Friction drive, absorbing all the shock, allows a chuck speed of 140 r.p.m. on  $\frac{5}{8}$ -in. work—50 per cent. faster than the usual tapping speed for that size. Uses but 1 h.p.

*Write for specifications*

**The Rickert-Shafer Co.**

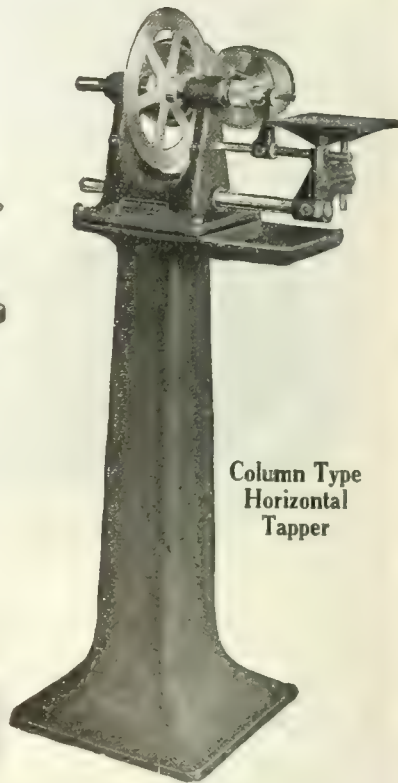
ERIE, PA., U.S.A.

FRED HERBERT, Foreign Agent, Coventry, England.

## Save Tap Breakage



$\frac{1}{4}$ -in.  
Vertical  
Tapper



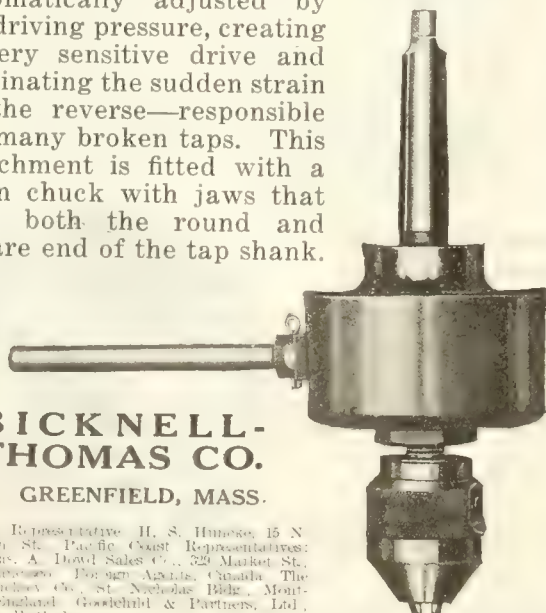
Column Type  
Horizontal  
Tapper

## THE BICKNELL-THOMAS TAPPING ATTACHMENT

*Fits Any Make Drill*

A friction mechanism inside the body of the attachment is automatically adjusted by the driving pressure, creating a very sensitive drive and eliminating the sudden strain of the reverse—responsible for many broken taps. This attachment is fitted with a plain chuck with jaws that grip both the round and square end of the tap shank.

Made to take  
taps from  
3-32" to 1-4"  
in diameter.

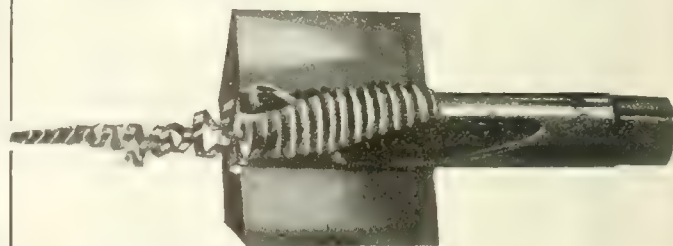


**BICKNELL-  
THOMAS CO.**

GREENFIELD, MASS.

Chicago Representative: H. S. Himes, 15 N. Jefferson St. Pacific Coast Representative: The Glas. A. David Sales Co., 729 Market St., San Francisco. Foreign Agents: The Jans Brothers Co., 81, Nicholas Bldg., Montreal. England: Goodfriend & Partners, Ltd., London, W.C. 1.

## THE "SEMPL" TAP



(Patent Applied For)

## A SCIENTIFICALLY CORRECT CUTTING TOOL

*makes tapping a pleasure*

The Most MODERN,  
The Most EFFICIENT,  
The Most ECONOMICAL.

Send for a "SEMPL" Sample Tap. Made in any thread  
Special Taps for blind holes.

**ROBERT SEMPLE**

*Manufacturing and Consulting Engineers*

179, West George St., GLASGOW, Scotland

Telephone: Central 9980 & 9981.

Tel grams: "Moderate, Glasgow."

WORKS—166, Dumbarton Road, Partick, Glasgow.  
Telephone: Western 2950.

BIRMINGHAM: County Buildings, 147, Corporation Street.  
Telephone: 3780 Central.

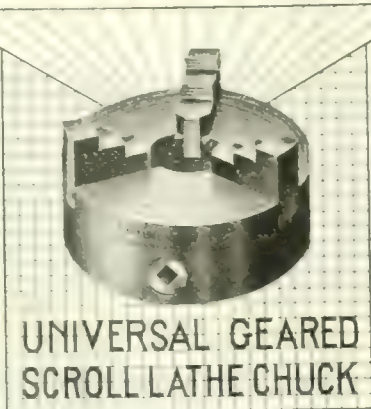
79, Royal Avenue, BELFAST.

VLADIVOSTOK, Siberia.

LONDON: 2, King Street, S.W. 1.

Telephone: 3801 Gerrard.

# ALMOND



UNIVERSAL GEARED  
SCROLL LATHE CHUCK

The body is a one-piece casting which eliminates parts and chattering when under heavy cutting pressure. The jaws are made of special alloy steel and hardened through making them stronger than the usual case hardened jaws. Two styles jaws—No. 1 Common Jaws, No. 2 Rervers Jaws.

## OTHER ALMOND PRODUCTS

Drill Chucks, Right Angle Transmission Micrometer Calipers, Flexible Steel Tubing.

**T. R. ALMOND Mfg., Co.**

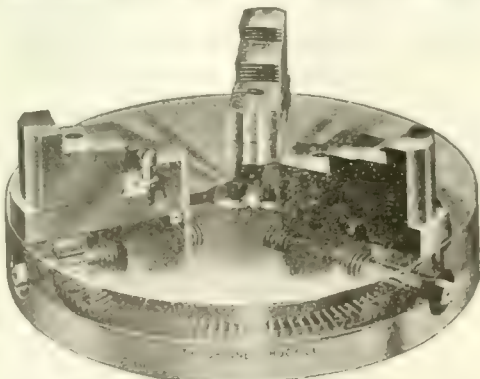
Ashburnam, Mass.

## Chucks and Their Capacity

You can't afford to have any idle machines in your plant. Down hours swiftly run up production costs and the efficiency in your shop can't be any greater than the efficiency of the EQUIPMENT on your machines. Machines equipped with

## SKINNER CHUCKS

are to be found in the majority of the better metal working plants of the world—because experience has demonstrated that Skinner Chucks are efficient—They grip and hold the work as it should be held—It's easy to quickly attach them. Their jaws are readily adjusted or reversed. They are so adaptable that they save many down hours and increased production results.



*If your chucking problems worry you why not talk them over with us?*

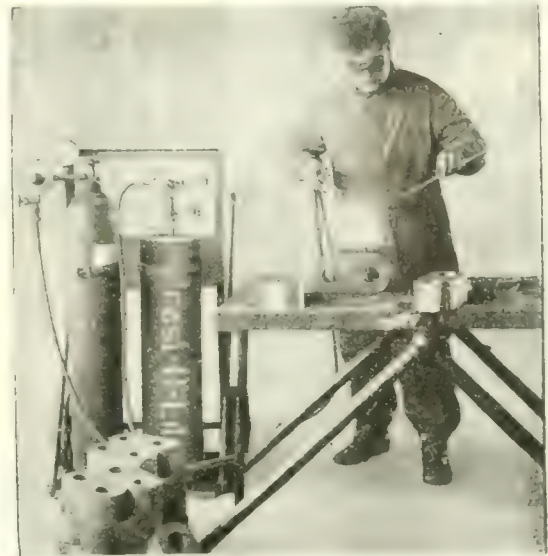
**The Skinner Chuck Co.**  
New Britain, Conn.

New York Office,  
91 Reade Street.

London Office,  
11, Queen Victoria St., London, E.C. 4

San Francisco Office,  
Rialto Building.

## OxyAcetylene Welding and Cutting



## Reclaimed at Small Cost Defective Castings

Expensive tie-ups are averted by the Prest-O-Lite process of Oxy-Acetylene welding. Frequently one repair will result in a saving of time and money far in excess of the cost of a Prest-O-Lite outfit.

But not only has this process proved itself a great money-saving factor in repair work. It has also been adopted as standard routine practice in many prominent metal working factories in all parts of Canada. The above illustration shows a Prest-O-Lite operator reclaiming defective castings which would ordinarily have found their way to the scrap pile.

## Prest-O-Lite PROCESS

employ both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene is leased by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones; provides dry, purified gas, ensuring better welds, quicker work, and lower operating cost.

Apparatus consists of an equal pressure hose pipe, automatic regulators and gauges, and all necessary equipment. Adaptable for oxy-acetylene cutting by the addition of special cutting blow pipe.

Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any operator who has who understands metals can adapt the welding process quickly and easily.

We will gladly send illustrated literature and interesting data showing actual instances of savings made by others. It may suggest valuable ideas to you. Write for it.

Address Department C—107

**Prest-O-Lite Company  
of Canada, Limited**

PREST-O-LITE BUILDING  
Corner Elm St. and Centre Ave.  
TORONTO

Plants at: Toronto, Ont., Merriton, Ont.  
Shawinigan Falls, P.Q., St. Boniface, Man.



**World's Largest Makers of Dissolved Acetylene**



# HOYT METALS

"Frost King"  
"Trojan"  
"Nickle Genuine"  
BABBITS

Hoyt Metals have been used with great success for many years.

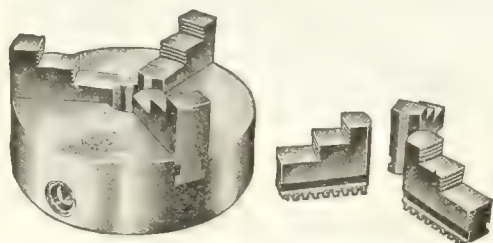
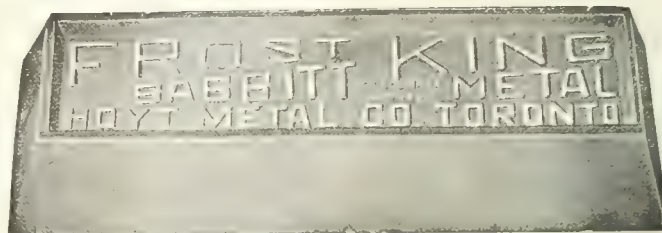
Put them to the test and you'll soon see a difference in your babbitt cost.

All elements entering into our mixtures are carefully refined and put together in such proportions and in such relation to each other that the best possible alloy is secured for the work for which it is designed.

Annual sales over \$5,000,000.

**Hoyt Metal Co., Toronto**

New York, N.Y. London, Eng. St. Louis, Mo.



No. 153 with Two Sets of Jaws.

## Union Geared Scroll Chucks

Have many points to recommend them. **SOLID BODY**—Gives strength and rigidity. **WEIGHT**—All parts are heavy and strong, and reinforced where necessary.

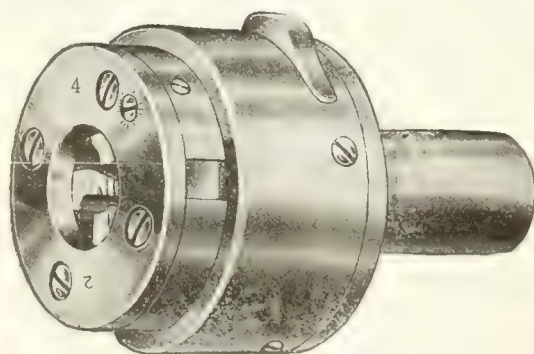
**QUALITY OF MATERIAL**—Best that can be procured.

**LAST AND BEST OF ALL—ACCURACY.** Union Chucks are Accurate.

**UNION MANUFACTURING COMPANY** - New Britain, Conn., U.S.A.

26 Cortlandt Street, New York

Makers of a Complete Line of Chucks



## H & G Die Heads

are of small outside diameter compared with the size of work they do.

The H. & G. illustrated is an automatic, self-opening Die Head designed especially for use on Gridley and National Acme Multiple Spindle Screw Machines and others that use the die in a revolving position. The four sizes of this Head cut up to 9/16", 1", 1 1/4" and 1 1/2".

All parts are hardened and ground and interchangeable. In a word—it's an H. & G.

Ask for Catalog

**Eastern Machine Screw Corp.**

New Haven, Conn., U.S.A.

## USHMAN

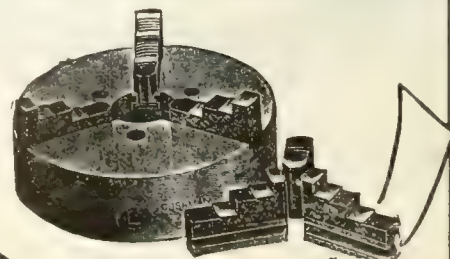
We've been Manufacturing  
**Nothing but Chucks  
and Their Accessories**

FOR NEARLY 60 YEARS

AND OUR PRODUCTS SHOW IT

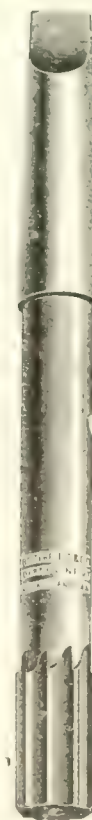
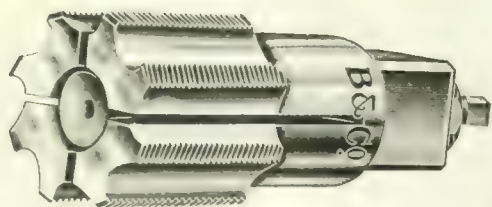
Years of experience in using our tools has convinced manufacturers that the word "Cushman" stamped upon a chuck is a guarantee of its quality and efficiency.

Let us send you our catalogue.  
Cushman Chuck Co., Hartford, Conn., U.S.A.



# utterfield

*Taps, Dies and Reamers*



## The Deciding Factor in Tool Economy is Quality

Every process in the manufacture of Butterfield Tools is performed by experts, whose entire aim is to produce the highest quality—and the rigid inspection prevents any possibility of inferior tools reaching the shipping room.

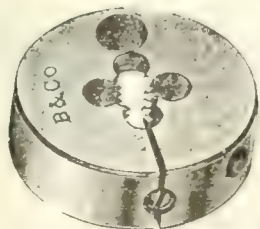
By the service afforded—by the ability to cut cleanly and accurately and to duplicate the work over a long period of use—Butterfield quality gives the maximum returns on your investment.

Butterfield Tools reflect splendidly our 35 years' continuous concentration on improvement in high speed tools. You can't go wrong with a Butterfield.

Send for Catalog No. 17. It's just out.

**Butterfield & Co., Inc., Rock Island, P.Q.**

Toronto Office : 220 King St., W.





# brute strength!

**B**RUTE STRENGTH, scientifically applied, without bulk or clumsiness — that's Williams' "Vulcan" Drop-Forged "C" Clamp.



All Williams' Clamps are built with a purpose for every clamping purpose — maximum capacity 18"

They are made for Heavy, Medium, Light and Tool-makers' Service by drop-forgers with nearly half a century's experience behind them. They are all guaranteed.

*Write for your copy of our catalog.*

J. H. WILLIAMS & CO.  
"THE DROP-FORGING PEOPLE."

45 VULCAN STREET,  
BUFFALO, N. Y.

45 RICHARDS STREET,  
BROOKLYN, N. Y.

The A. G. Low Co., Ltd., 45 Pacific Ave., Saskatoon, Sask.  
Agents for Manitoba, Saskatchewan, Alberta and British Columbia

## Williams' Drop-Forged Clamps

# A Combination

Strength  
Uniform Proportion  
Economy  
Service  
Weight

A  
N  
D

Accuracy  
Simplicity of Operation  
Efficiency  
Satisfaction  
Power

=s

C  
I  
S  
C  
O  
  
L  
A  
T  
H  
E  
S

It is the best lathe made and you pay no premium. It will suit your shop, your employee, your business.

Yes, we can make immediate delivery.

14-inch (belt) any length  
18-inch (belt) any length  
18-inch geared head, any length

16-inch (belt) any length  
24-inch (belt) any length  
24-inch geared head, any length

and good delivery on motor drive.

**THE CISCO MACHINE TOOL COMPANY - CINCINNATI, U.S.A.**

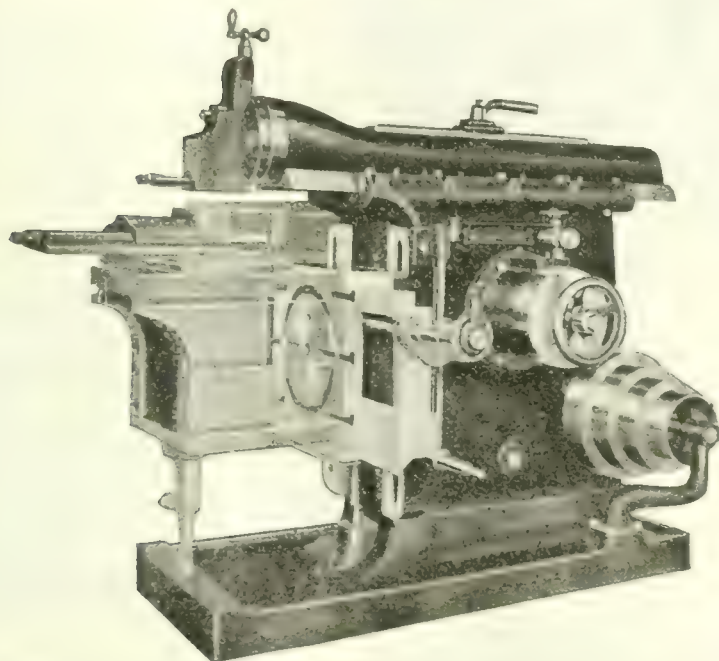
*Makers of*

**THE LATHE WITH THE PULL---THE LATHE OF SIMPLIFIED ACCURACY**

*If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.*

# Milwaukee Shapers

Are needed in Up-to-Date  
Canadian Shops



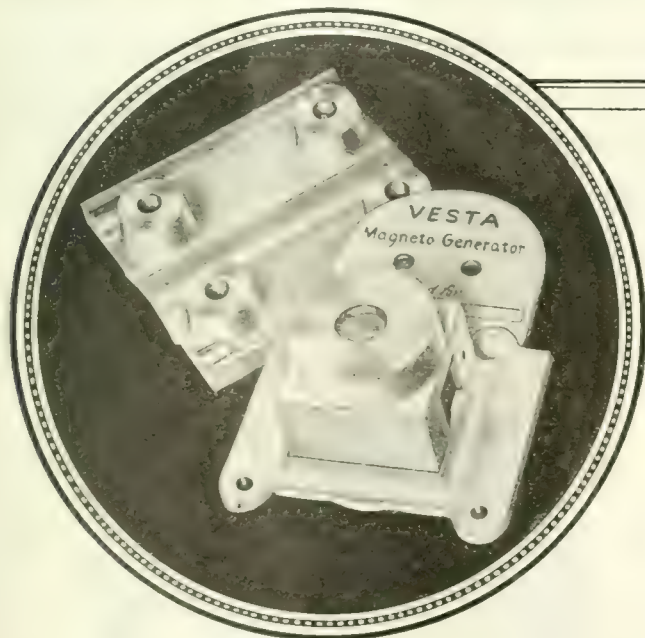
A line that is unexcelled in Rigidity, Accuracy, Power, Simplicity and Production.

Built in three Sizes :  
16 inch, 20 inch and  
24 inch.

Write for descriptive  
Bulletins.

**MILWAUKEE  
SHAPER CO.**

1029 Coldspring Ave.  
Milwaukee, Wisconsin



**FRANKLIN  
DIE-CASTINGS**

## *Our Experience Applied to Your Problem*

Franklin Die-castings increase and economize production at a vital point. Machined parts may be ever so perfect, but their cost is high and the process slow.

Where it is practical at all to die-cast instead of machine, Franklin Die-Castings are the ones to use. That is the testimony of many manufacturers.

We have served them in this matter and achieved our reputation for uniform success during a period covering 27 years of specializing in this work.

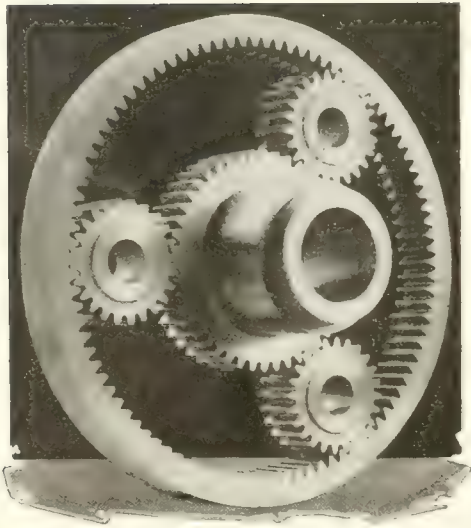
*We are equipped to cast in aluminum, lead, tin and zinc base alloys.*

*Send sample or blue print for recommendation and estimate. Ask for Booklet "C."*

**Franklin Mfg. Company**  
746 Gifford St., SYRACUSE, N.Y., U.S.A.



# Internal Gears



with accurately planed  
generated teeth.

This is a job for  
specialists. We can do  
it right.

**Hamilton Gear CO. LTD.**

**Van Horne St. TORONTO**

## Don't Waste Time With Dull Files

Tell men to turn them  
in when dull and get  
new ones.

If you specify Famous  
Five Files when ordering,  
you can count on getting  
the right amount of work  
out of a file before it dulls.

Famous Five Files are accurately  
ground and cut, and scientifically  
hardened. Skilled workmen  
know them as the standard tools.  
There is one for every kind of  
work on wood or metal.

They are:



*How long would it take to clean this Cylinder by your present methods--and what would be the labor cost alone?*



*How long would it take to pay for a Sand-Blast Installation from the saving in labor cost if you cleaned it in 3 minutes?*

CLEANED IN THREE MINUTES BY

## PANGBORN SAND BLASTS

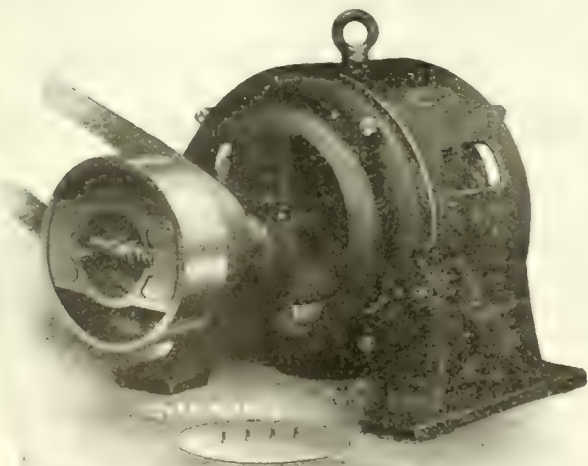
and whether your requirements are the cleaning of Castings, Forgings, Stampings, Sheet, Plate or Structural, or the removal of scale from Heat Treated Parts there's a Pangborn Unit or Combination for every need, large or small, that will make a saving for you—and a more attractive product.



## Centrifugal Friction Clutches

To Ensure the Easy Starting of A.C. & Squirrel Cage Motors

$\frac{1}{2}$  H.P. to 1500 H.P.



**No Motor Should be Without This Simple and Unique Device.**

**Entirely Dispenses With all Starting Difficulties**

**The Clutch also Effects a Great Saving in Current Consumption and Reduces the Initial Cost of Motor and Switchgear.**

Please Mention Speed and H.P. of Motor When Sending Enquiries and State the Current Supply.

*Write for Catalogues and Full Particulars*

**Thomas Broadbent & Sons, Limited**  
HUDDERSFIELD, ENGLAND



# HINTS TO BUYERS

## DARLING BROTHERS, LIMITED

Engineers, Manufacturers and Founders  
120 Prince Street, MONTREAL, P.Q.

*Pumps for any Service—Steam Appliances—  
Freight Elevators—Webster Vacuum  
Heating System.*

## PRESSES and SHEARS

Sheet Metal Working Machinery  
**THE D. H. STOLL CO., INC.**  
26 Lansing St., BUFFALO, N.Y.

## Bryant Chucking Grinder Company

Springfield, Vermont

Builders of

**Hole, Hole and Face and Deep  
Hole Grinders**

## BRISTOL'S ELECTRIC PYROMETERS FOR EVERY SERVICE



Bristol's Recording Pyrometer furnished with patented frictionless smoked chart recording system, especially valuable for processes requiring continuous heat treatment. Simplicity of construction and ruggedness make them ideal shop pyrometers. The ONLY pyrometer equipped with Weston milli-volt-meter movement.

Write for Bulletin I-205.

**THE BRISTOL CO.**  
WATERBURY, CONN., U.S.A.

## "TOP NOTCH" SUPERIOR STEEL

(AS ITS NAME IMPLIES—IT LEADS THEM ALL)

High Speed Steel	High Speed Milling Cutters
High Speed Tool Bits	Carbon Tool Steel
High Speed Drill Rods	Carbon Drill Rods
High Speed Twist Drills	Music Wire
High Speed Bridge Reamers	Tungsten Hack Saw Blades



**L.C. BLANCHE & CO., Inc.**  
MANUFACTURERS

10-12 Thomas St., New York, N.Y.  
WORKS: TAUNTON, MASS.

WAREHOUSES:

NEW YORK  
PHILADELPHIA

BOSTON  
CHICAGO

DETROIT  
CLEVELAND

## STEEL CASTINGS

**E**LECTRIC Steel Castings of  
all kinds from 5 pounds to  
5,000 pounds.

PROMPT DELIVERY

**Manitoba Steel Foundries, Ltd.**

1204 McArthur Building  
Winnipeg - - - Manitoba



## Fairbanks Hammers

25 to 300 lbs.

**Belt or Motor Drive**

These Hammers Embody a  
Design and Workmanship  
that are unsurpassed.

Send for Catalog

**UNITED HAMMER CO.**

Oliver Building Boston, Mass.

## Canadian Steel Foundries Need Frost Improved Sand Mills



### WINNING FEATURES

Heavy Mullers  
Unloading Device  
Motor or Belt Drive

**The Frost Mfg. Co.**  
112 W. Adams St., Chicago

If what you need is not advertised, consult our Buyers' Directory and all advertisers listed under proper heading.



<b>IMPORTERS OF</b> <h2 style="margin: 0;">WHEEL TRUEING TOOL CO.</h2> <b>DETROIT</b> <h2 style="margin: 0;">INDUSTRIAL DIAMONDS</h2> <p style="font-size: small;">Goods Submitted on Memorandum if Desired</p> <p style="font-size: small;">JOHN W. GORDON, Manager</p> <p style="font-size: small;">5 James Street, ST. CATHARINES, ONTARIO</p>		<b>MANUFACTURERS OF</b> <h2 style="margin: 0;">DIAMOND POINTED TOOLS</h2> <p style="font-size: small;">All Mountings Fully Guaranteed</p> <p style="font-size: small;">Office and Factory:</p> <p style="font-size: small;">88 West Pitt Street, WINDSOR, ONTARIO</p>
---	---	--

## CLUTCHES

Combined Jaw and Friction. Friction only.  
Gas Engine Clutches. Jaw Clutches.

*Write for interesting printed matter.*

The Positive Clutch & Pulley Works, Ltd., Canada  
MONTREAL      Factory: Aurora, Ont.      TORONTO

FOR EVERY INDUSTRIAL REQUIREMENT



## WILLSON GOOGLES

REG. U.S. PAT. OFF.

ONE PAIR  
OR 20,000  
PER DAY

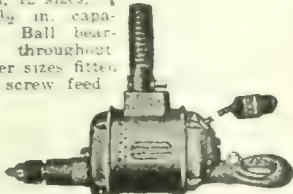
## WRITE FOR CATALOG

T. A. Willson & Co., Inc. Canadian Office: 23 Scott St., Toronto

## “Cincinnati Electrics”

### Cut Your Costs

Hand or Breast Drills, 12 sizes, 1/4 to 2 1/2 in. capacity. Ball bearing throughout. Larger sizes fitted with screw feed.



We make complete line of Portable Electric Drills and Grinders for all purposes. Especially built to withstand hard usage. For all currents and voltages. Catalog?

Cincinnati Electric Tool Co., Cincinnati, Ohio

## STEEL CASTINGS

### DELIVERY

### QUALITY

## JOLIETTE STEEL CO.

LIMITED

Sales Office:  
MONTREAL, Que.

Works:  
JOLIETTE, Que.

# WILKINSON & KOMPASS

TORONTO HAMILTON WINNIPEG

## IRON AND STEEL HEAVY HARDWARE

Mill Supplies      Automobile Accessories

WE SHIP PROMPTLY

## SMELTERS & WELDERS GOGGLES

We have a style to meet every requirement



Write for Catalogue  
**Consolidated Optical Company**

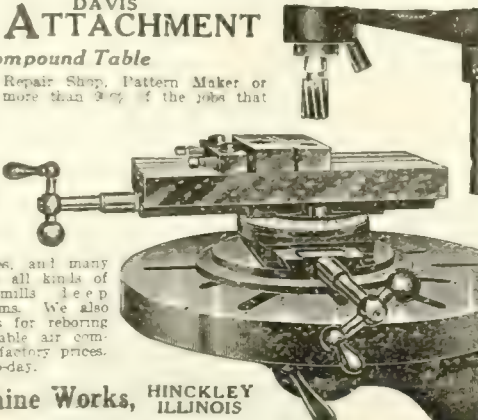
Montreal      Toronto      Winnipeg      Vancouver

## THE DAVIS MILLING ATTACHMENT

and Compound Table

For the Die Maker, Repair Shop, Pattern Maker or Garage; will perform more than 90% of the jobs that come up.

For any Drill Press 14" to 42" swing Big Economy—Big Convenience—Small Price. It relieves your large millers, comes in handy spotting castings, milling ends of boxes, and many other odd jobs. Cuts all kinds of keyseats perfectly; mills deep grooves, slots and cams. We also make cylinder reamers for reboring Ford car, and a reliable air compressor—all at special factory prices. Write for circulars to-day.



Hinckley Machine Works, HINCKLEY ILLINOIS

SEND US YOUR INQUIRIES AND PRINTS FOR QUOTATIONS  
ON **SPRING SHACKLE BOLTS** OR  
PRESSED STEEL AND BRASS GREASE CUPS OILERS OIL CUPS



“PLAIN”







“SECTIONAL”

Samples and Catalogues  
Sent on Request

Canadian Winkley Co.  
Limited  
Windsor, Ont.

If interested tear out this page and place with letters to be answered.



# J.C. McLAREN BELTING

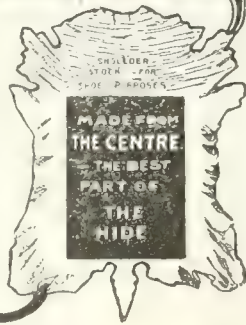


**Will Save You Money  
In Every Day of Service**

Modern plant and thorough knowledge of requirements of belting guarantees perfect satisfaction to all buyers. Our belts are the result of using best leather, and our 57 year's experience.

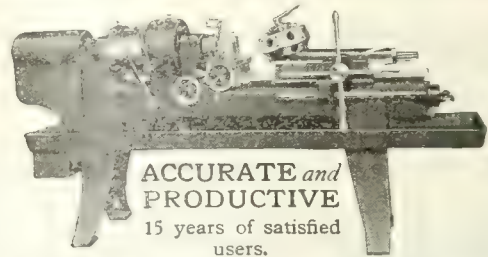
Ask for Quotations.

**J. C. McLAREN BELTING CO.**  
Limited  
Montreal Toronto Winnipeg



## THE TILTED TURRET

A CLEAR TRACK FOR THE STOCK



Ask the User

Send for Catalog

**WOOD TURRET MACHINE CO.**

BRAZIL INDIANA U.S.A.

## Forrest, Jackson & Forrest

Engineers, Contractors and Manufacturers' Agents

Portable Cranes, Turntables, Trans-  
veyors, Plastic Metallic Packing

HEAD OFFICE : 222 Craig St. W., Montreal, Can.



## NORTON JACKS

FOR ALL KINDS OF HEAVY LIFTING

Send for complete catalogue showing  
50 styles 10 to 100 tons capacity.

Made  
only by **A. O. NORTON, Limited**  
Coaticook, Prov. Quebec, Canada

## PRESSES ALL—TYPES



Press Attachments, Automatic.  
Metal and Wire Forming Machines.  
Tumblers—Large Line.  
Burnishing Machines. Grinders.  
Special Machines.

Baird Machine Co., Bridgeport, Conn., U. S. A.

## FITCHBURG

**Plain Cylindrical  
Grinders**

Built by

**Fitchburg Grinding Machine Co.**  
FITCHBURG, MASS., U.S.A.



## GEARS AND GEAR CUTTING SPROCKETS AND CHAINS

In stock and to order, any size from one-  
quarter inch to six-foot in diameter, any  
material. Estimates and gear advice cheer-  
fully furnished.

**Grant Gear Works, Inc.**, 151 Pearl St.  
Boston, Mass.  
G. B. GRANT U.S.A.

## Toronto Testing Laboratory

METALLURGISTS, CHEMISTS, FUEL ENGINEERS

160 Bay St., Toronto.

Tests of Metals, Fuels, Oils, Water, Etc.  
**INDUSTRIAL RESEARCH**



**WE MANUFACTURE RIVETS** of every  
description,  $\frac{5}{8}$  inch. dia. and smaller

**PARMENTER & BULLOCH CO., LTD.**  
GANANOQUE, ONT.

If interested tear out this page and place with letters to be answered.



## ARMCO IRON Welding Rods

OXY-ACETYLENE ELECTRIC

**make safe welding easy**

Armco Rods are 99.84 per cent. pure iron. No other fillers equal them in purity and uniformity of composition. Two kinds of rods of guaranteed analysis, one for electric and one for oxy-acetylene welding, do all the work (and better work) that formerly required many different compositions. Armco Rods flow freely, weld evenly, and give a joint that lends itself practically to all finishing operations. Send for booklet.

## PAGE STEEL & WIRE CO.

Sales Offices: 30 Church St., New York

Chicago: 29 South La Salle St. Detroit: 35-57 Washington Boulevard. San Francisco: American Rolling Mill Company of California. Canadian Distributors: Taylor & Arnold, Ltd., Montreal, Toronto, Winnipeg



11

## Special Belt Problems

Drives that require speeding up or those called upon to give increased power, oftentimes present problems to the engineer or master mechanic. Again, a drive may be required to run in an atmosphere laden with Dust, Gas, Steam or Acid Fumes where a belt could not be considered. Our engineers are ever ready to help on such problems and our experience is yours for the asking.

Save by securing data and estimates of "Morse" Drives.

MORSE CHAIN CO., ITHACA, N.Y.

Engineering Service, Assistance Bulletin

Boston	Detroit	Pittsburgh	Montreal
Chicago	Greensboro, N.C.	San Francisco	Minneapolis
Cleveland	New York	Atlanta	St. Louis

## Davis-Bournonville Oxy-Acetylene Welding and Cutting Apparatus

"Made in Canada"

AT NIAGARA FALLS, ONT.

DAVIS-BOURNONVILLE COMPANY

Sales Offices: 168 King St. W., Toronto; 44 Craig St. W., Montreal. Factories in Jersey City, Elkhart, Ind.; Niagara Falls, Ont. Sales Offices in all principal United States cities.



"MADE IN CANADA"

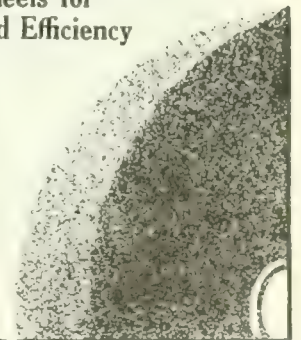
Mention  
CANADIAN MACHINERY  
When Writing to Advertisers

## Buy Your Grinding Wheels Direct! Brantford Wheels for Durability and Efficiency

Remember this when you are considering an order for Emery Wheels. We sell direct to the user—you save the middleman's profit. Then you can depend upon our wheels giving the most efficient service our wheels represent highest quality in raw materials and manufacture.

Give them a trial.

Brantford Emery Wheel Co.  
Brantford, Ontario



## Philadelphia GEAR Works

VINE STREET PHILADELPHIA, PA.

Spir, Bevel, Spiral, Herringbone and Intermittent

## GEARS and PINIONS

Made in all kinds of metals, rawhide and fibre

SOCKET WHEELS  
MADE TO ORDER

DISTRIBUTORS OF  
DIAMOND CHAINS

For Power Transmission, Machinery and Motor Trucks, Motor-Cycles and Bicycles.

We ship gears to all parts of Canada. Write us when you want good gears, good service, good prices.

Get our Catalogue: "All About Gears."



BEVEL  
BEVELS

## BERNARD

is the Canadian-made Clutch—reliable, safe and modern.

**There Is No Better Friction Clutch**

Some cost more because they are imported. But, foreign or Canadian-made, no other clutch will give better satisfaction. Let us know your requirements.



Orders quickly filled.

**The A. Bernard Industrial Co.**

Manufacturers of High Grade Power Transmission Appliances

Office and Works: Fortierville, Quebec, Canada





**Save Power!  
Save Coal!**

American Steel Split Pulleys reduce belt slip and air resistance to a minimum. They cut down power wastage and save coal. Guaranteed for double belt service and rim speeds up to 6,000 feet per minute. Write for 37-page booklet, "Getting Maximum Pulley Efficiency."

**THE AMERICAN  
PULLEY CO.**  
Philadelphia, Pa.

**AMERICAN  
STEEL SPLIT  
PULLEYS**

# LUBRICATING PUMPS

To be efficient should throw a heavy, steady stream of coolant at will of machine operator.

They should be rotary geared to force the coolant into deep cuts and bores. They should operate at low speed, thus insuring long life, but while running at low speed, pumps must also have large capacity.

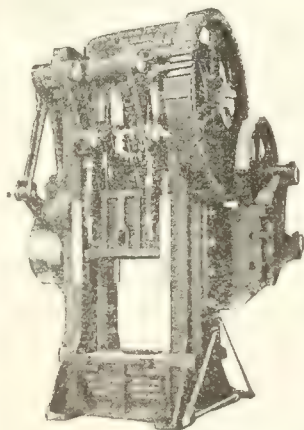
All of these requisites will be found in the TRAHERN.



**Trahern Pump Co.** *Rockford, Illinois.*

## The "TOLEDO"

### Toggle Drawing Presses



The "Toledo" Toggle  
Drawing Press  
50 sizes, 7500 to 650,000  
lbs.

Their performance more than justifies our claims for the one simple, practical, effective toggle mechanism which secures a perfect rest of dwell of the blank holder, exerts all the required power, and eliminates wasters.

For economically and accurately drawing stamped steel and enameled ware, bath tubs, caskets, auto bodies, stove parts and similar articles.

**The Toledo Machine & Tool Co.**  
**TOLEDO, OHIO**

Representatives: Allied Machinery Co., 1 Avenue de l'Industrie, Paris, France; A. N. Satterbre, 12 Turin, Italy; 16 Seidengasse, Zurich, Switzerland.

### The Canadian Disc Sander is 90% Dustless

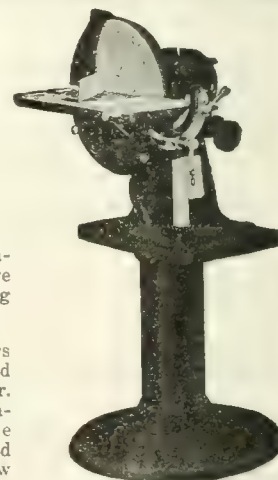
Think what a godsend that is to the pattern shop! Hundreds of prominent concerns are profiting immensely by using these sanders.

Two types of Canadian sanders are built—the Disc Sander and the Oscillating Spindle Sander.

Both machines are equipped with New Departure ball bearings

and General Electric motor. The table in each case can be tilted by a hand adjustment, 45 degrees down or 15 degrees up. Power is obtained by plugging into a lamp socket. Canadian Sanders are extraordinarily well built and are guaranteed against all defects.

*Ask for Bulletin and Prices*



**Canadian Sander Mfg. Co.,**  
Incorporated  
**Brockville, Ont.**



# Canadian Machinery Buyers Directory

If what you want is not here, write us, and we will tell you where to get it. Let us suggest that you consult also the advertisers' index facing the inside back cover, after having secured advertisers' names from this directory. The information you desire may be found in the advertising pages. This department is maintained for the benefit and convenience of our readers. The insertion of our advertisers' names under proper headings is gladly undertaken, but does not become part of an advertising contract.

## ABRASIVE MATERIALS

Aikenhead Hardware Co., Toronto, Ont.  
Brantford Emery Works Co., Brantford.  
Canadian Fairbanks-Morse Co., Montreal.  
Geo. F. Foss Mch. & Sply. Co., Montreal.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Norton Co., Worcester, Mass.  
Plewes, Ltd., Winnipeg, Man.  
Pittsburgh Crushed Steel Co., Pittsburgh.  
Rice Lewis & Son, Toronto, Ont.  
Williams & Wilson, Ltd., Montreal.

## ACETYLENE

Carter Welding Co., Toronto, Ont.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Union Carbide Co., Toronto, Ont.  
Welding & Supplies Co., Montreal, Que.

## ACETYLENE GENERATORS

Prest-O-Lite Co., Inc., Toronto, Ont.  
Welding & Supplies Co., Montreal, Que.

## ACORN DIE AND HOLDERS

Greenfield Tap & Die Corp., Greenfield, Mass.  
Wells Bros. of Canada, Ltd., Ont.

## ACCUMULATORS, HYDRAULIC

Canadian Fairbanks-Morse Co., Montreal.  
Garlock-Walker Mach. Co., Toronto.  
Metalwood Mfg. Co., Detroit, Mich.  
Niles-Rement-Pond Co., New York.  
Williams & Wilson, Ltd., Montreal.

## AIR COMPRESSORS

See Compressors.

## AIR CYLINDERS

Smalley-General Co., Bay City, Mich.

## AIR RECEIVERS

Can. Ingersoll-Rand Co., Sherbrooke, P.Q.  
Dominion Bridge Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.  
St. Lawrence Welding Co., Montreal.  
Williams & Wilson, Ltd., Montreal.  
Welding & Supplies Co., Montreal, Que.

## AIR WASHERS

Can. Blower & Forge Co., Kitchener.

## ALUMINUM

Canada Metal Co., Toronto.  
Tallman Brass & Metal Co., Hamilton.  
Williams & Wilson, Ltd., Montreal.

## ALLOY, STEEL

Armstrong, Whitworth & Co., Montreal.  
Blacks Co., L. C., New York, U.S.A.  
Baker & Co., Inc., H. Montreal, Que.  
Firth & Sons, Thos., Montreal, Que.  
General Steel Co., Milwaukee, Wis.  
Hawkenize Bros. Co., Boston, Mass.  
Kaiser-Elison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.  
Pilot Steel & Tool Co., Montreal, Que.  
Swedish Steel & Importing, Montreal.  
Vanadium Alloys Steel Co., Pittsburgh.  
Vulcan Crucible Steel Co., Aliquippa, Pa.

## ANCHORS

Fellows Bros., Ltd., Chasley Heath, Eng.

## ARBORS

Brown & Sharp Mfg. Co., Providence, R.I.  
Canadian Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Ford-Smith Machine Co., Hamilton, Ont.  
Wilson & Co., J. C., Belleville, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Pratt & Whitney Co., Hartford, Conn.  
Whitman & Barnes Mfg. Co., Akron, O.  
Williams & Wilson, Limited, Montreal.

## ARCHITECTURAL IRON

Page Steel & Wire Co., Adrian, Mich.

## ARRESTERS, DUST

Northern Crane Wks., Walkerville, Ont.  
Panther Corporation, Hagerstown, Md.

## AUTOGENOUS WELDING AND CUTTING PLANTS

Carter Welding Co., Toronto, Ont.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
St. Lawrence Welding Co., Montreal.  
Welding & Supplies Co., Montreal, Que.

## AUTOMATIC MACHINERY

Baird Machine Co., Bridgeport, Conn.  
Garlock-Walker Mach. Co., Toronto.  
Garner & Son, Rochester, N.Y.  
National Acme Co., Cleveland, Ohio.  
Pratt & Whitney Co., Hartford, Conn.  
Rochester Machine & Tool Co., Toronto.  
Williams Mach. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal.

## AUTOMATIC METAL CUTTING-OFF MACHINES

Greenfield Tap & Die Corp., Greenfield, Mass.  
Wells Bros. of Can., Galt, Ont.  
Aikenhead Hardware Co., Toronto, Ont.  
Canadian Fairbanks-Morse Co., Montreal.  
Canada Metal Co., Toronto.  
G. F. Foss Mch. & Sply. Co., Montreal.

## GUT SHEET METAL MACHINERY

Quickwork Co., St. Marys, Ohio.

## AUXILIARY HEADS

Hoefler Mfg. Co., Freeport, Ill.

## BABBITT METAL

Canada Metal Co., Ltd., Toronto, Ont.  
Hast Metal Co., Ltd., Toronto.  
Magna Metal Co., Montreal.  
Rice Lewis & Son, Toronto, Ont.  
Tallman Brass & Metal Co., Hamilton.  
Wilkinson & Kompass, Hamilton, Ont.  
Williams & Wilson, Limited, Montreal.

## BAND SAWS

Oliver Machy. Co., Grand Rapids, Mich.

## BALL BEARINGS

Canadian Fairbanks-Morse Co., Montreal.  
Case S. K. F. Co., Toronto, Ont.  
Chapman Double Ball Bearing Company, Toronto.  
The Gray Ball Bearing Co., Ltd., Toronto.  
Morrow Screw & Nut Co., John, Ingersoll.  
Rochester Ball Bearing Co., Rochester.  
Williams & Wilson, Ltd., Montreal, Que.

## BALLS, STEEL

Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Blacks Co., L. C., New York, U.S.A.  
Chapman Double Ball Bearing Co., Toronto.  
Baker & Co., Inc., Montreal, Que.  
Gray Ball Bearing Co., Ltd., Toronto.  
Rochester Ball Bearing Co., Rochester.  
Mastered, Son & Binney, Toronto.  
Williams & Wilson, Limited, Montreal.

## BALLS, BURNISHING

Gray Ball Bearing Co. Ltd., Toronto.

## BAROMETERS

Taylor Instrument Co., Rochester, N.Y.

## BARRELS, SAND-BLAST

Paragon Corp., Hagerstown, Md.

## BARRELS, STEEL SHOP

Rand Machine Co., Bridgeport, Conn.  
Cleveland Wire Spring Co., Cleveland.

## BARRELS, TUMBLING

Baird Machine Co., Bridgeport, Conn.  
Katie Foundry, Galt, Ont.  
Northern Crane Works, Walkerville, Ont.  
Wilson & Co., J. C., Belleville, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

## BASE FACING MACHINES

Victoria Foundry Co., Ottawa, Ont.

## BARS, BORING

Gisholt Machine Co., Madison, Wis.  
Niles-Rement-Pond Co., New York.  
Wilson & Co., J. C., Belleville, Ont.  
Williams & Co., J. H., Brooklyn, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.

## BARS, MERCHANT

Algonia Steel Corp., Sault Ste. Marie.

## BARS, CONCRETE REINFORCING

Algonia Steel Corp., Sault Ste. Marie.

## BEADING MACHINES

Quickwork Co., St. Marys, Ohio.

## BELT CONVEYORS

Can. Link-Belt Co., Toronto, Ont.

## BEARINGS, BRONZE

Wilson & Co., J. C., Belleville, Ont.

## BEARINGS, DIE CAST

Franklin Mfg. Co., Syracuse, N.Y.

## BELT-LACING MACHINES, HOOKS AND PINS

Clippier Belt Lacer Co., Grand Rapids.

## BELT LACING LEATHER

Aikenhead Hardware Co., Toronto, Ont.  
G. F. Foss Mch. & Sply. Co., Montreal.  
Graton & Knight Mfg. Co., Worcester, Mass.  
Rice Lewis & Son, Toronto, Ont.

## BELTING, BALATA

Que Federal Engineering Co., Toronto, Ont.

## BELT HOOKS, WIRE

Clippier Belt Lacer Co., Grand Rapids.

## BELTING, RUBBER

Can. Consolidated Rubber Co., Montreal.

## BELTING, CHAIN

Can. Fairbanks-Morse Co., Montreal.  
Can. Link-Belt Co., Toronto, Ont.  
Jones & Glasco, Montreal, Que.  
Morse Chain Co., Ithaca, N.Y.  
Whitney Mfg. Co., Hartford, Conn.  
Williams & Wilson, Ltd., Montreal, Que.

## BELTING, CONVEYOR

Can. Consolidated Rubber Co., Montreal.  
Baxter & Co., Ltd., J. R., Montreal.  
Canadian Fairbanks-Morse Co., Montreal.  
Federal Engineering Co., Ltd., Toronto.  
Graton & Knight Mfg. Co., Worcester, Mass.  
Jones & Glasco, Montreal, Que.  
McLaren Belting Co., J. C., Montreal.  
Morse Chain Co., Ithaca, N.Y.  
Plewes, Ltd., Winnipeg, Man.  
Rice Lewis & Son, Toronto, Ont.  
Standard Machy. & Supplies, Montreal.  
Williams & Wilson, Ltd., Montreal, Que.

## BELTING, FRICTION AND SURFACE

Can. Con. Rubber Co., Ltd., Montreal.

## BELTING, LEATHER

Can. Graton & Knight Mfg. Co., Montreal.  
John Tullis & Son, Glasgow, Scotland.

## BELTING, WOVEN

Federal Engineering Co., Ltd., Toronto.

## BENDING ROLLS, PLUTE & AUG

Wickes Bros., Saginaw, Mich.

## BENDING MACHINERY

Bertram, Ltd., Edinburgh, Scotland.  
Bertram & Sons Co., John, Dundas, Ont.  
Brown-Biggs Co., Ltd., Hamilton, Ont.  
Can. Blower & Forge Co., Kitchener.  
Garlock-Walker Mach. Co., Toronto.  
Williams & Wilson, Ltd., Montreal.

## BLASTING MACHINES, SAND

Garlock-Walker Machinery Co., Toronto.  
Jardine, A. B., & Co., Hespeler, Ont.  
National Mach. Co., Tiffin, Ohio.  
Niles-Rement-Pond Co., New York.  
Selside Machine & Tool Co., Toledo.  
Williams & Wilson, Limited, Montreal.

## BILLET MARKERS

Mathews & Co., Jas. H., Pittsburgh, Pa.

## BILLETS

Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Sassah Steel & Importing Co., Ltd., Montreal.  
Algonia Steel Corp., Sault Ste. Marie.  
Kaiser-Elison & Co., Ltd., Montreal.  
Mastered, Son & Binney, Toronto.  
Norton, Ralph B., Agent, Montreal.

## BILLETS, FORGING

General Steel Co., Milwaukee, Wis.  
Kaiser-Elison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.

## BINS, STEEL

Dunn & Warr & Iron Works, London, Ont.  
Dominion Bridge Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.  
Toronto Iron Works, Ltd., Toronto, Ont.  
William Hamilton Co., Peterboro, Ont.

## BLACKSMITH WORK

The Thos. Park Co., Ltd., Pembroke.

## BLASTING MACHINES, SHOT AND STEEL GRIT

Pittsburgh Crushed Steel Co., Pittsburgh.

## BLOOMS AND SLABS

Algonia Steel Corp., Sault Ste. Marie.

## BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.  
Garlock-Walker Machinery Co., Toronto.  
MacKinnon & Co., Montreal, Que.  
Williams & Wilson, Limited, Montreal.

## BLOW PIPES AND REGULATORS

Carter Welding Co., Toronto, Ont.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Welding & Supplies Co., Montreal, Que.

## BLUE PRINTING MACHINERY

Campana Camera Co., Providence, R.I.

## BOARDS, GLASS CUTTING

Lufkin Rule Co., of Can., Windsor, Ont.

## BOARTZ

Joyce, Koebel & Co., Inc., New York.

## BOLT CUTTERS

Greenfield Tap & Die Corp., Greenfield, Mass.

## BOLT CUTTERS

Fellows Gear Shaper Co., Springfield, Va.  
Greenfield Tap & Die Corp., Greenfield, Mass.

Wells Bros. of Can., Galt, Ont.

Williams & Wilson, Ltd., Montreal, Que.

## BOOKS, TECHNICAL

MacLean Publishing Co., Toronto.

## BOILERS

Dominion Bridge Co., Montreal, Que.

MacGovern & Co., Montreal, Que.

## BOILER BREECHINGS

William Hamilton Co., Peterboro, Ont.

## BOLT CUTTERS AND NUT TAPERS

Aikenhead Hardware Co., Toronto, Ont.  
Canadian Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Landis Machine Co., Waynesboro, Pa.  
A.B. Jardine & Co., Ltd., Hespeler, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Wells Bros. Co. of Canada, Galt, Ont.  
Williams & Wilson, Limited, Montreal.

## BOLTS

Aikenhead Hardware Co., Toronto, Ont.  
London Bolt & Nut Co., London, Ont.  
Morrow Screw & Nut Co., John, Ingersoll.  
Rice, Lewis & Son, Toronto, Ont.  
Steel Co., of Canada, Ltd., Hamilton.  
Wilkinson & Kompass, Hamilton, Ont.  
Williams & Co., I. H., Brooklyn, N.Y.

## BOLTS COUPLING

Galt Machine Shop Co., Ltd., Galt, Ont.

## BOLTS, STAY

Morrow Screw & Nut Co., John, Ingersoll.

## BOLTS, SPRING SHAKLE

Can. Winkley Co., Ltd., Windsor, Ont.

Morrow Screw & Nut Co., John, Ingersoll.

## BOLTS, PATCH

Morrow Screw & Nut Co., John, Ingersoll.

## BOLT AND NUT MACHINERY

Bertram & Sons Co., John, Dundas, Ont.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Garner & Son, Rochester, N.Y.  
Landis Machine Co., Waynesboro, Pa.  
National Acme Co., Cleveland, Ohio.  
National Machinery Co., Tiffin, Ohio.  
Williams & Wilson, Ltd., Montreal, Que.  
Williams Machinery Co., A. R., Toronto.

## BOLT THREADING MACHINERY

Jardine & Co., Ltd., H. Hespeler.  
Landis Machine Co., Waynesboro, Pa.  
National Acme Co., Cleveland, Ohio.  
Victor Tool Co., Waynesboro, Pa.  
Williams & Wilson, Limited, Montreal.

## BORING MACHINES, PNEUMATIC CYLINDER

Cleveland Pneumatic Tool Co., Toronto.  
Canadian Pneumatic Machine Co., Montreal.  
Can. Ingersoll-Rand Co., Sherbrooke, Que.  
Garlock-Walker Mach. Co., Toronto.

## BORING MACHINES, UPRIGHT AND HORIZONTAL

Bertram & Sons Co., John, Dundas, Ont.  
Bettis Machine Co., Rochester, N.Y.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Oliver Machine Co., Grand Rapids, Mich.  
Hoefler Mfg. Co., Freeport, Ill.  
Loomis Tool Co., Waynesboro, Pa.  
Niles-Rement-Pond Co., New York.  
Rochester Machine & Tool Co., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## BORING AND TURNING MILLS

Bertram & Sons Co., John, Dundas, Ont.  
Bettis Machine Co., Rochester, N.Y.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Oliver Machine Co., Grand Rapids, Mich.  
Foss Mch. & Sply. Co., Geo. F., Montreal.  
Niles-Rement-Pond Co., New York.  
Williams & Wilson, Ltd., Montreal, Que.



## CANADIAN MACHINERY

### BOXES, CAST IRON

Brown & Sharpe Mfg. Co., Providence, R.I.

**BOXES, STEEL SHOP AND TOTE**  
Cleveland Wire Spring Co., Cleveland.

**BRAKEBAND LINING CUTTERS**  
Peck, Stow & Wilcox Co., Southington, Conn.

### BRAKES

Brown, Boggs & Co., Hamilton, Can.  
Electric Steel & Metals, Ltd., Welland.

**BRASS AND COPPER BARS, RODS  
BRAKES, CORNICES**  
Peck, Stow & Wilcox Co., Southington, Conn.

### BRASS FOUNDERS

Canada Metal Co., Toronto.  
Greenleafs, Ltd., Belleville, Ont.  
St. Lawrence Welding Co., Montreal.  
Tallman Brass & Metal Co., Hamilton.  
Wilson & Co., J. C., Belleville, Ont.

**BRASS WORKING MACHINERY**  
Foster Machine Co., Elkhart, Ind.  
Garlock-Walker Machinery Co., Toronto.  
Warner & Swasey Co., Cleveland, O.  
Niles-Bement-Pond Co., New York.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Wood Turret Machine Co., Brazil, Ind.  
Williams Mach'y Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

### BRICKS, FIRE

Harbison-Walker Refractories, Montreal.

**BRIDGES, RLY. AND HIGHWAY**  
Dominion Bridge Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.

**BRONZE RODS AND SHEETS,  
PLATES**  
Brown's Copper & Brass Rolling Mills,  
New Toronto.

**BRONZE, NAVAL**  
Brown's Copper & Brass Rolling Mills,  
New Toronto.  
Canada Metal Co., Toronto.  
Tallman Brass and Metal Co., Hamilton.

### BRONZE COPPER

Canada Metal Co., Toronto.

### BUFFING AND POLISHING MACHINERY

Ford-Smith Mach. Co., Hamilton.  
Foss Mch'y. & S'ply Co., Geo. F. Montreal.  
Garlock-Walker Machinery Co., Toronto.  
Williams & Wilson, Limited, Montreal.

### BUCKETS, DUMP

MacKinnon Steel Co., Sherbrooke, Que.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.

### BUCKETS, ELEVATOR

Can. Link-Belt Co., Toronto, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.

**BUCKETS, CLAM SHELL, CRAB,  
DUMP**

Can. Link-Belt Co., Toronto, Ont.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.  
Northern Crane Works, Ltd., Walkerville.

### BULLDOZERS

Bertram & Sons Co., John, Dundas.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Williams & Wilson, Limited, Montreal.

**BURNERS, OIL AND NATURAL  
GAS**  
Northern Crane Works, Ltd., Walkerville.

**BURRS, IRON AND COPPER**  
Larmer & Bellch Co., Gananoque.

### BUSHINGS, BRONZE

Morrow Screw & Nut Co., John, Ingersoll.

### CAMPERS

Brown & Sharpe Mfg. Co., Providence, R.I.  
Peck, Stow & Wilcox Co., Southington, Conn.

**CABINETS, SAND BLAST**  
Fangborn Corporation, Hagerstown, Md.

### CABLE, ELECTRIC

International Machinery & Supply Co.,  
Ltd., Montreal, Que.

### CALKS, BOOT

Duffin Rule Co., of Can., Windsor Ont.

**CANADA SILVER SHEETS, ROLLS**  
Brown's Copper & Brass Rolling Mills,  
New Toronto.

### CANNERS' MACHINERY

Bliss E. W. Co., Brooklyn, N.Y.  
Brown, Boggs & Co., Hamilton, Can.

### CANNERS' CONVEYORS

Can. Link-Belt Co., Toronto Ont.  
Wilson & Co., J. C., Belleville, Ont.

### CARBIDE

Union Carbide Co., Toronto, Ont.

### CARBONIZING BOXES

Can. Driver-Harris Co., Ltd., Walkerville  
Katie Foundry, Galt, Ont.  
Morris Crane & Hoist Co., Ltd., Herbert,  
Niagara Falls, Ont.  
Swedish Crucible Steel Co., Windsor.

# BUYERS' DIRECTORY

**CARRIERS, PNEUMATIC TUBE**  
Jones & Glasco, Montreal.

### CARS, INDUSTRIAL

Can. Blower & Forge Co., Kitchener, Ont.  
Can. Fairbanks-Morse Co., Ltd., Montreal.  
Elec. Steel & Metals, Welland, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.  
Morris Crane & Hoist Co., Ltd., Herbert,  
Niagara Falls, Ont.

### CASTINGS, MACHINERY

Wilson & Co., J. C., Belleville, Ont.

**CASTINGS, ALUMINUM, BRASS  
BRONZE, COPPER, AND GUN  
METAL**

Algoma Steel Corp., Sault Ste. Marie.  
Brookville Foundry Co., Brockville, Ont.  
Franklin Mfg. Co., Syracuse, N.Y.  
Canada Metal Co., Ltd., Toronto, Ont.

### CASTINGS, DIE CAST

Canada Metal Co., Ltd., Toronto, Ont.  
Franklin Mfg. Co., Syracuse, N.Y.

**CASTINGS, STEEL—ALL KINDS**  
Electric Steel & Metals Co., Welland.

### CARRIERS

#### COUPLING BOLTS

John Morrow Screw & Nut Co., Ingersoll  
Alexander Fleck, Ltd., Ottawa.  
Greenleafs Ltd., Belleville, Ont.  
St. Lawrence Welding Co., Montreal.  
Tallman Brass & Metal Co., Hamilton.

### CASTINGS, BENCH LEG.

Brown & Sharpe Mfg. Co., Providence, R.I.

**CASTINGS, BRASS AND IRON**  
Algoma Steel Corp., Sault Ste Marie.  
International Machinery and Supply Co.,  
Ltd., Montreal, Que.

### CASTINGS, BUILDING

Katie Foundry, Galt, Ont.

### CASTINGS, GRAY IRON

Bernard Industrial Co., A., Fortierville, Q.  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Brown Rogers Co., Ltd., Hamilton.  
Alexander Fleck, Ltd., Ottawa.  
Garbner & Son, Reel, Montreal.  
Greenleafs, Ltd., Belleville, Ont.  
Hull Iron & Steel Foundries, Ltd., Hull.  
International Malleable Iron Co., Guelph.  
Kennedy & Sons, Ltd., Wm., Owen  
Sound.  
Katie Foundry, Ltd., Galt, Ont.  
Hamilton Co., Wm., Peterboro.  
Wilson & Co., J. C., Belleville, Ont.

### CASTINGS, PLUMBERS'

Katie Foundry, Galt, Ont.

### CASTINGS, NICHROME

Can. Driver-Harris Co., Ltd., Walkerville

### CASTINGS, HARDWARE

Katie Foundry, Galt, Ont.

**CASTINGS, STEEL CHROME AND  
MANGANESE STEEL**

Thos. Davidson Mfg. Co., Montreal, Que.  
Doms Foundries & Steel, Hamilton, Ont.  
Hull Iron & Steel Foundries, Ltd., Hull.  
Kennedy & Sons, Ltd., Owen Sound.

### CASTINGS, MALLEABLE

International Malleable Iron Co., Guelph

### CASTINGS, NICKEL STEEL

Hull Iron & Steel Foundries, Ltd., Hull.

### CEMENT MACHINERY

Can. Fairbanks-Morse Co., Ltd., Montreal.  
Garner, Robt. & Son, Montreal.

**CEMENT HANDLING MACHINERY**  
Can. Link-Belt Co., Toronto, Ont.

### CENTERING MACHINES

Victoria Foundry Co., Ottawa, Ont.

### CENTRE REAMERS

Bertram & Sons Co., John, Dundas.  
Brown Rogers Co., Ltd., Hamilton.  
Garner, Robt. & Son, Montreal.  
H. D. Rogers Mch. Co., South Sud-  
bury, Mass.

Morrow Screw & Nut Co., J., Ingersoll, Ont.  
Niles-Bement-Pond Co., New York.  
Peck & Whitlow Co., Dundas, Ont.  
Wells Bros. Co. of Canada, Galt, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.

### CHAIN, WELDED COIL

Morris Crane & Hoist Co., Herbert, Ni-  
agara Falls, Ont.

### CHAIN BLOCKS

Aikenhead Hardware Co., Toronto, Ont.  
Can. Fairbanks-Morse Co., Ltd., Montreal.  
Ford Chain Block & Mfg. Co., Phila., Pa.  
Garlock-Walker Mach'y Co., Toronto.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Williams & Wilson, Ltd., Montreal, Que.  
Jones & Glasco, Montreal, Que.

### CHAINS, AGRICULTURAL

Morse Chain Co., Ithaca, New York.

**CHAINS, AUTOMOBILE ENGINE**  
Morse Chain Co., Ithaca, New York.

**CHAINS, BICYCLE, DRIVE AND  
BLOCK**  
Morse Chain Co., Ithaca, New York.

**CHAINS, FOR ELEVATORS AND  
CONVEYORS**

Can. Link-Belt Co., Toronto, Ont.  
Morse Chain Co., Ithaca, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.

**CHAIN, MALLEABLE, DETACH-  
ABLE AND RIVETED**

Can. Link-Belt Co., Toronto, Ont.  
Morse Chain Co., Ithaca, N.Y.  
Williams & Wilson Ltd., Montreal, Que.

**CHAINS, POWER TRANSMISSION**  
Morse Chain Co., Ithaca, N.Y.

**CHAINS, SPROCKET WHEEL**  
Morse Chain Co., Ithaca, N.Y.

### CHAIN DRIVES

Can. Link-Belt Co., Toronto, Ont.  
Coventry Chain Co., Coventry, England.  
Jones & Glasco, Montreal, Que.  
Morse Chain Co., Ithaca, N.Y.

### CHASERS

National Acme Co., Cleveland, Ohio.  
Taylor, J. A. M., 318 Stair Bldg.,  
Toronto, Ont.

### CHEMISTS

Toronto Testing Laboratory, Ltd., Toronto

### CHISELS

Whitman & Barnes Co., St. Catharines.

**CHUCKS, AERO, AUTOMATIC**  
Garvin Machine Co., New York.

**CHUCKS, COLET, AIR**  
Elliott & Whitehall Mach. & Tool Co.  
Galt, Ont.

Smalley-General Co., Inc., Bay City, Mich.  
Williams & Wilson, Ltd., Montreal, Que.

**CHUCKS, DRILL, LATHE AND  
UNIVERSAL**

Aikenhead Hardware Co., Toronto, Ont.  
Almond Mfg. Co., Ashburnham, Mass.  
Bicknell-Thomas Co., Greenfield, Mass.  
Bertram & Sons Co., John, Dundas.  
Can. Blower & Forge Co., Kitchener, Ont.  
Can. Fairbanks-Morse Co., Ltd., Montreal.  
Cushman Chuck Co., Hartford, Conn.  
Foss Mch'y. & S'ply Co., G. F., Montreal.  
Garbner, Robt. & Son, Montreal.  
Garlock-Walker Mach'y Co., Toronto.  
Gisholt Machine Co., Madison, Wis.  
Hardinge Bros., Chicago, Ill.  
Jacobs Mfg. Co., Hartford, Conn.  
Modern Tool Co., Erie, Pa.  
Rice Lewis & Son, Toronto, Ont.  
Skinner Chuck Co., New Britain, Conn.  
Whitton Machine Co., D. E., New  
London, Conn.  
Williams & Wilson, Ltd., Montreal, Que.

**CHUCKS, DRILL, AUTOMATIC  
AND KEYLESS**

Aikenhead Hardware Co., Toronto, Ont.  
Bicknell-Thomas Co., Greenfield, Mass.  
Can. Blower & Forge Co., Kitchener.  
Whitney Mfg. Co., Hartford, Conn.

**CHUCKS, FRICTION AND TAP**  
Bicknell-Thomas Co., Greenfield, Mass.  
Victor Tool Co., Waynesboro, Pa.

**CHUCKS, MAGNETIC**  
Heald Machine Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal, Que.

**CHUCKS, RING WHEEL**  
Ford-Smith Mach. Co., Hamilton, Ont.  
Gardner Machine Co., Beloit, Wis.

**CHUCKING MACHINES**  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Garvin Machine Co., New York.  
Gisholt Machine Co., Madison, Wis.  
National Acme Co., Windsor, Vt.  
Niles-Bement-Pond Co., New York.  
Rice-Lewis Machine & Tool Co., Toronto.  
Warner & Swasey Co., Cleveland, O.  
Wood Turret Mach. Co., Brazil, Ind.  
Williams & Wilson, Ltd., Montreal, Que.

**CIRCULATING SYSTEMS FOR  
LUBRICATING OIL**

Williams & Co., J. H., Brooklyn, N.Y.

**CLEANING COMPOUND**  
Oakley Chemical Co., New York.

**CLOCK SPRINGS**  
The Dunbar Brothers Co., Bristol, Conn.

**CLOCKS, WATCHMAN, PORTABLE**  
Gisholt Machine Co., Madison, Wis.  
Hardinge Bros., Inc., Chicago, Ill.

**CLUTCHES, CHAIN**  
Wright Mfg. Co., Lisbon, Ohio.

**CLUTCHES, FRICTION AND  
PULLEY**

Bernard Industrial Co., A., Fortierville, Q.  
Can. Link-Belt Co., Toronto, Ont.  
Carlyle Johnson Mach. Co., Manchester,  
Conn.  
Jones & Glasco, Montreal, Que.  
Williams & Wilson, Ltd., Montreal, Que.

**COAL HANDLING MACHINERY**  
Can. Link-Belt Co., Toronto, Ont.  
Dominion Bridge Co., Montreal, Que.  
MacGovern & Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.

Northern Crane Works, Walkerville, Ont.  
Williams & Wilson, Limited, Montreal.

Nova Scotia Steel & Coal Co., New  
Glasgow, N.S.

**COLD ROLLED STRIP, ALL METAL  
COLLARS, SHAFTING**

Can. Driver-Harris Co., Ltd., Walkerville  
Wilson & Co., J. C., Belleville, Ont.  
Williams & Co., J. H., Brooklyn, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.

**COLLECTORS, PNEUMATIC**  
Can. Blower & Forge Co., Kitchener.  
J. C. Wilson & Co., Belleville, Ont.

### COLLETS

Becker Milling Machine Co., Boston.  
Hardinge Bros., Inc., Chicago, Ill.  
Wilson & Co., J. C., Belleville, Ont.

**COMPOSITION INGOT**  
Brown's Copper & Brass Rolling Mills,  
New Toronto.  
Canada Metal Co., Toronto, Ont.

**COMBINED OPEN SIDE PLANNER-  
SHAPER**  
Lynd-Farquhar Co., Boston, Mass.

**COMPRESSORS, AIR**  
Can. Ingersoll-Rand Co., Sherbrooke.  
Cleveland Pneumatic Tool Co., Toronto.  
Curtis Pneumatic Mach'y Co., St. Louis.  
Garlock-Walker Mach'y Co., Toronto.  
Hinckley Machine Co., Hinckley, Ill.  
MacGovern & Co., Montreal, Que.  
Williams & Wilson, Ltd., Montreal, Que.

**CONDENSERS**  
MacGovern & Co., Montreal, Que.  
Smalley-General Co., Inc., Bay City,  
Mich.

**CONNECTING RODS**  
Canada Found's & Forgings, Ltd., Wel-  
land, Ont.

**CONTRACT WORK**  
Brown Engineering Corp., Toronto.  
Ford-Smith Machine Co., Hamilton, Ont.  
Homer & Wilson, Hamilton, Ont.  
Katie Foundry, Ltd., Galt, Ont.  
Marten Machine Co., Hamilton, Ont.  
St. Lawrence Welding Co., Montreal.  
Victoria Foundry Co., Ottawa.  
Wilson & Co., J. C., Belleville, Ont.  
Windsor Mach. Tool Co., Windsor, Ont.

**CONTROLLERS, MAGNETIC  
BRAKES, ELEC. WINCHES,  
MONO RAIL HOISTS**  
Volta Mfg. Co., Welland, Ont.

**CONTROLLERS AND STARTERS**  
Williams Mach'y Co., A. R., Toronto.

**CONTROLLING INSTRUMENTS**  
Taylor Instrument Co., Rochester, N.Y.

**CONVERTERS, ROTARY**  
MacGovern & Co., Montreal, Que.

**CONVEYORS, BELT AND CHAIN**  
Can. Link-Belt Co., Toronto, Ont.  
Jones & Glasco, Montreal.

**COOLERS, WITH DRINKING  
FOUNTAINS**  
Puro Sanitary Drinking Fountain Co.,  
Haydenville, Mass.

**COPING MACHINES**  
Bertram & Sons Co., John, Dundas.  
Garlock-Walker Machinery Co., Toronto.  
Niles-Bement-Pond Co., New York.  
Can. Blower & Forge Co., Kitchener.

**COPPER, BUS BAR, SHEET,  
PATES, RODS**  
Brown's Copper & Brass Rolling Mills,  
New Toronto, Ont.

**COTTER PINS**  
Whitman & Barnes Co., St. Catharines.

**COUNTERBORES AND COUNTER-  
SINKS**  
Aikenhead Hardware Co., Toronto, Ont.  
Blanchet Co., L. C., New York City.  
Cleveland Twist Drill Co., Cleveland.  
Morse Twist Drill & Mach. Co., New  
Bedford, Mass.  
Pratt & Whitney Co., Dundas, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.

**COUNTERSHAFTS**  
Almond Mfg. Co., Ashburnham, Mass.  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Gray Ball Bearing Co., Ltd., Toronto.  
Baird Machine Co., Bridgeport, Conn.  
Ford-Smith Machine Co., Hamilton, Ont.  
Foster Machine Co., Elkhart, Ind.  
Williams & Wilson, Ltd., Montreal, Que.

**COUPLINGS, FRICTION**  
Bernard Industrial Co., The A., Fortier-  
ville, Que.

Can. Link-Belt Co., Toronto, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**COUPLINGS, RAPID HOSE**  
Int. Machinery & Supply Co., Ltd.,  
Montreal, Que.

**COILING MACHINERY, WIRE  
AND SPRING**  
Garlock-Walker Machinery Co., Toronto

**COKE AND COAL**  
Hanna & Co., M. A., Cleveland, O.





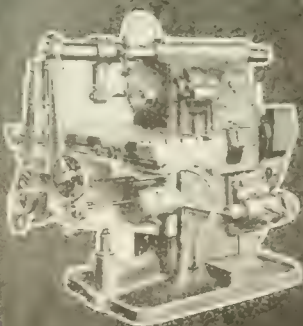
## Railroad Results

Results reveal more than words—for this reason, we suggest that you inquire in the different shops and judge by what you see and hear about the many accomplishments of

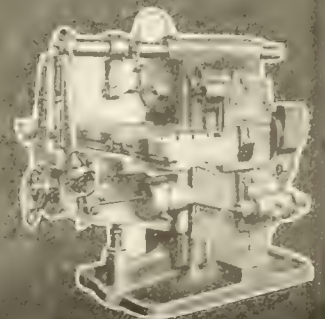
### **Brown & Sharpe Heavy Service Milling Machines**

Then send for our Milling Machine Book which describes the construction of one of the most practical machine tools found in any modern shop.

**Brown & Sharpe Mfg. Co.**  
Providence, R.I., U.S.A.



**Brown & Sharpe  
Heavy Service  
Milling Machines**



*If interested tear out this page and place with letters to be answered.*



**COUPLINGS, PLAIN, FLEXIBLE  
AND CUT OFF**

Cleveland Pneumatic Tool Co., of  
Canada, Toronto.  
Gardner, Robt. & Son, Montreal.  
Independent Pneumatic Tool Co., Chicago  
Wilson & Co., J. C., Belleville, Ont.

**CRANES, LOCOMOTIVE**

Can. Link-Belt Co., Toronto, Ont.  
Northern Crane Works, Walkerville

**CRANES, OVERHEAD, HAND AND  
ELECTRIC**

Volta Manufacturing Co., Welland, Ont.

**CUPS, OIL**

Can. Winkley Co., Ltd., Windsor, Ont.

**COVERS, OIL HOLE**

Can. Winkley Co., Ltd., Windsor, Ont.

**CRANES, GANTRY**

Can. Link-Belt Co., Toronto, Ont.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.  
Northern Crane Works, Walkerville.

**CRANE RUNWAYS**

MacKinnon Steel Co., Sherbrooke, Que.

**CRANES, GOLIATH, PNEUMATIC  
AND PORTABLE**

Morris Crane and Hoist Co., Herbert,  
Niagara Falls, Ont.  
Northern Crane Works, Walkerville.  
Wilson & Co., J. C., Belleville.  
Williams & Wilson, Ltd., Montreal, Que.

**CRANES, TRAVELLING, ELECTRIC  
AND HAND POWER**

Can. Link-Belt Co., Toronto, Ont.  
Curtis Pneumatic Machy. Co., St. Louis,  
Dominion Bridge Co., Montreal.  
Hepburn, John T., Ltd., Toronto.  
MacKinnon Steel Co., Sherbrooke, Que.  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.  
Niles-Bement-Pond Co., New York.  
Northern Crane Works, Walkerville.

**CRANK SHAFTS**

Canada Foundry & Forgings Ltd., Welland  
Williams & Co., J. H., Brooklyn, N.Y.

**CRANES, PORTABLE**

Aikenhead Hardware Co., Toronto, Ont.  
Can. Link-Belt Co., Toronto.

Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.

Northern Crane Works, Walkerville.  
Rice Lewis & Son, Toronto, Ont.

J. G. Wilson & Co., Belleville, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**CRIMPS, LEATHER**

Graton & Knight Mfg. Co., Worcester,  
Mass.

**CRUSHERS**

Elee Steel & Metals, Welland, Ont.

**CUPOLAS**

Can. Blower & Forge Co., Kitchener.  
Northern Crane Works, Walkerville.

**CURB PUMPS FOR OIL, GASOLINE**

Bassey Co., Ltd., S. F., Toronto, Ont.

**CURRENT TRANSFORMERS**

Volta Manufacturing Co., Welland, Ont.

**CUT-OFF COUPLINGS, FRICTION**

J. C. Wilson & Co., Belleville, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**CUTTERS, BOLT**

See Bolt Cutters.

**CUTTERS, GFARS**

Brown & Sharpe Mfg. Co., Providence, R.I.  
Fellows Gear Shaper Co., Springfield, Vt.

**CUTTERS, FLUE**

Cleveland Pneumatic Tool Co., Toronto.

**CUTTER HEADS**

Oliver Machinery Co., Grand Rapids, Mich.

**CUTTERS, PIPE (See Pipe Cutters)**

**CUTTERS, MILLING**

Becker Milling Mach. Co., Boston, Mass.

Baker & Co., Inc., H., Montreal, Que.

Butterfield & Co., Rock Island, Que.

Brown & Sharpe Mfg. Co., Providence, R.I.

Can. Fairbanks-Morse Co., Ltd., Montreal

Cleveland Twist Drill Co., Cleveland, Ohio

Davidson Tool Mfg. Co., New York, N.Y.

Elliott & Whitehall Mach. & Tool Co.,  
Galt, Ont.

Foss Mch. & S'ply Co., G. F., Montreal.

Garvin Machine Co., New York.

Minors Tool Works, Chicago, Ill.

Morse Twist Drill & Machine Co., New  
Bedford.

Pratt & Whitney Co., Dundas, Ont.

Pilot Steel & Tool Co., Montreal, Que.

Rice Lewis & Son, Toronto, Ont.

Tabor Mfg. Co., Philadelphia, Pa.

Whitman & Barnes Mfg. Co., Akron, O.

Williams & Wilson, Ltd., Montreal, Que.

**CUTTING-OFF MACHINES**

Armstrong Bros., Tool Co., Chicago.

Beckwith & Sons Co., John Dundas

Brown & Sharpe Mfg. Co., Providence, R.I.

Can. Fairbanks-Morse Co., Ltd., Montreal

Curtis & Curtis Co., Bridgeport, Conn.

Foss Mch. & S'ply Co., G. F., Montreal

Garvin Machine Co., New York.

Greenfield Tap & Die Corp., Greenfield,  
Mass.

Hurlburt, Rogers Machy. Co., South  
Sudbury, Mass.  
Hall & Sons, John H., Brantford, Ont.  
Kennedy & Sons, Wm., Owen Sound.  
Niles-Bement-Pond Co., New York, N.Y.  
Peerless Machine Co., Racine, Wis.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Racine Tool & Machine Co., Racine, Wis.  
Tabor Mfg. Co., Philadelphia, Pa.  
Wells Bros. of Can., Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**CUTTING COMPOUND AND CUT-  
TING OIL**

Cataract Refining Co., Ltd., Toronto.

**CUTTING OIL, RECLAIMING  
SYSTEM**

Bassey Co., Ltd., S. F., Toronto, Ont.

**CUTTING AND WELDING PLANTS**

Prest-O-Lite Co., Inc., Toronto, Ont.

Welding & Supplies Co., Montreal, Que.

**CYANIDE AND LEAD BATH POTS**

Swedish Crucible Steel Co., Windsor.

**CYLINDERS, AIR**

Ford-Smith Machine Co., Hamilton, Ont.

Smalley General Co., Inc., Bay City, Mich.

**CYLINDERS, AUTOMATIC REBOR-  
ING JIGS AND REAMERS**

Hinckley Machine Co., Hinckley, Ill.

Kelley Reamer Co., Cleveland, O.

**DERRICKS**

Aikenhead Hardware Co., Toronto, Ont.

Dominion Bridge Co., Montreal.

Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.

**DIAMOND TOOLS**

Ford-Smith Machine Co., Hamilton, Ont.

Joyce-Koebel Co., Inc., New York City.

Wheel Truening Tool Co., Detroit.

Williams & Wilson, Limited, Montreal.

**DIAMONDS, CARBON AND BORTZ**

Wheel Truening Tool Co., Detroit

**DIAMONDS, BLACK AND ROUGH**

Joyce, Koebel & Co., Inc., New York.

Wheel Truening Tool Co., Windsor, Ont.

**DIE BLOCKS**

General Steel Co., Milwaukee, Wis.

**DIE HEADS, AUTOMATIC**

Greenfield Tap & Die Corp., Greenfield,  
Mass.

Wells Bros. of Can., Galt, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**DIES, BRASS PRINTING, EMBOS-  
ING AND LETTERING**

Matthews, Jas. H., & Co., Pittsburgh, Pa.

**DIES FOR BIT BRACE USE**

Butterfield & Co., Rock Island, Que.

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Wells Brothers Co., of Canada, Galt.

**DIES AND DIE STOCKS**

Aikenhead Hardware Co., Toronto, Ont.

Atkins & Co., Ltd., Wm., Sheffield, Eng.

Baker & Co., Inc., H., Montreal, Que.

Butterfield & Co., Rock Island, Que.

Brown, Boggs Co., Hamilton, Ont.

Can. Fairbanks-Morse Co., Montreal.

Foss Mch. & S'ply Co., G. F., Montreal.

Gardner, Robt. & Son, Montreal.

A. B. Jardine & Co., Hespeler, Ont.

Landis Machine Co., Waynesboro, Pa.

Marshall, Son & Bunney, Toronto.

Modern Tool Co., Erie, Pa.

Morse Twist Drill & Mch. Co., New Bed-  
ford, Mass.

National Acme Co., Cleveland, Ohio.

Pilot Steel & Tool Co., Montreal, Que.

Pratt & Whitney Co., Dundas, Ont.

Rice Lewis & Son, Toronto, Ont.

Rickert Shaper Co., Erie, Pa.

Stoll Co., Inc., D. H., Buffalo, N.Y.

Wells Brothers of Canada, Galt, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**DIES, PIPE THREADING**

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Landis Machine Co., Waynesboro, Pa.

Williams & Wilson, Ltd., Montreal, Que.

**DIES, THREADING**

Butterfield & Co., Inc., Rock Island, Que.

Greenfield Tap & Die Corp., Greenfield,  
Mass.

Wells Bros. of Can., Galt, Ont.

**DIE SINKERS**

Becker Milling Machine Co., Boston

Garvin Machine Co., New York.

Pratt & Whitney Co., Dundas, Ont.

**DIES FOR MACHINES**

Aikenhead Hardware Co., Toronto, Ont.

Butterfield & Co., Rock Island, Que.

Firth & Sons, Thos., Montreal, Que.

Landis Machine Co., Waynesboro, Pa.

Wells Brothers Co. of Canada, Galt.

**DIE HEADS**

Greenfield Tap & Die Corp., Greenfield,  
Mass.

Wells Bros. of Canada, Galt, Ont.

**DIES, SELF-OPENING**

Geometric Tool Co., New Haven

Landis Machine Co., Waynesboro, Pa.

Modern Tool Co., Erie, Pa.

Murphy Machine & Tool Co., Detroit.

Wells Brothers Co. of Can., Galt, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**DIE FILING MACHINES**

Oliver Mach. Co., Grand Rapids, Mich.

**DIE STEEL, HOT AND COLD****WORK**

Armstrong-Whitworth of Can., Montreal.  
Atkins & Co., Ltd., Wm., Sheffield, Eng.

Marshall, Son & Bunney, Toronto.

Firth & Sons, Thos., Montreal, Que.

Kayser-Ellison & Co., Ltd., Montreal.

Norton, Ralph B., Agent, Montreal.

**DIES FOR SCREW PLATES**

Butterfield & Co., Inc., Rock Island, Que.

Wells Bros. Co. of Can., Galt, Ont.

**DIES, SHEET METAL WORKING**

E. W. Bliss Co., Brooklyn, N.Y.

Brown, Boggs & Co., Hamilton, Canada

Illinois Tool Works, Chicago, Ill.

Marthen Machine Co., Hamilton, Ont.

Stoll Co., D. H., Buffalo, N.Y.

**DIES, SCREW AND THREAD**

Butterfield & Co., Rock Island, Que.

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Landis Machine Co., Waynesboro, Pa.

Modern Tool Co., Erie, Pa.

Murphy Machine & Tool Co., Detroit.

National Acme Co., Cleveland, Ohio.

Pratt & Whitney Co., Dundas, Ont.

Wells Bros. Co. of Can., Galt, Ont.

**DISCS, LEATHER, STEEL**

Graton & Knight Mfg. Co., Worcester,  
Mass.

Swedish Steel & Importing Co., Montreal.

**DIRECT CONNECTED UNITS**

MacGovern & Co., Montreal, Que.

**DRAFT, MECHANICAL**

W. H. Bandfield & Sons, Toronto.

Butterfield & Co., Rock Island, Que.

Can. Blower & Forge Co., Kitchener.

A. B. Jardine & Co., Hespeler, Ont.

Pratt & Whitney Co., Dundas, Ont.

**DRESSERS, GRINDING AND****EMERY WHEEL**

Can. Desmond-Stephan Mfg. Co., Hamilton

Wheel Truening Tool Co., Windsor, Ont.

Williams & Wilson, Limited, Montreal

**DRILL PRESSES**

Aurora Tool Works, Aurora, Ind.

W. F. & John Barnes Co., Rockford,

Can. Blower & Forge Co., Kitchener.

Canada Machinery Corp., Galt, Ont.

Foss Mch. & S'ply Co., G. F., Montreal.

Garlock-Walker Machinery Co., Toronto

Garvin Machine Co., New York.

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Niles-Bement-Pond Co., New York.

U. S. Mach. Tool Co., Cincinnati, Ohio.

A. R. Williams Machinery Co., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**DRILL RODS**

Atkins & Co., Ltd., Wm., Sheffield, Eng.

Kayser-Ellison & Co., Ltd., Montreal.

Marshall, Son & Bunney, Toronto.

Norton, Ralph B., Agent, Montreal.

Swedish Steel & Importing Co., Ltd.,  
Montreal.

**DRILLING MACHINES, GANG**

Barnes, W. F. & John, Co., Rockford, Ill.

Bilton Mach. Tool Co., Bridgeport, Conn.

Canada Machinery Corp., Galt, Ont.

Silver Mfg. Co., Salem, Ohio.

Williams & Wilson, Ltd., Montreal, Que.

**DRILLING MACHINES, LOCOMO-  
TIVE AND MULTIPLE SPINDLE**

John Bertram & Sons Co., Dundas.

Canadian Fairbanks-Morse Co., Montreal.

Canada Machinery Corp., Galt, Ont.

Garlock-Walker Machinery Co., Toronto.

Henry & Wright Mfg. Co., Hartford, Conn.

Landis Tool Co., Waynesboro, Pa.

Niles-Bement-Pond Co., New York.

Williams & Wilson, Limited, Montreal

**DRILLING MACHINES, RADIAL**

**AND TURRET**

John Bertram & Sons Co., Dundas.

Canadian Fairbanks-Morse Co., Montreal.

Canada Machinery Corp., Galt, Ont.

Garlock-Walker Machinery Co., Toronto.

Henry & Wright Mfg. Co., Hartford, Conn.

Landis Tool Co., Waynesboro, Pa.



# TRUE VALUE



IT ISN'T  
WHAT YOU PAY FOR,  
BUT  
WHAT YOU GET

THAT COUNTS IN THE LONG RUN

THE FIRST COST OF **"MORSE" DRILLS** IS FULLY JUSTIFIED  
BY THE **LONG SERVICE** RENDERED

THINK IT OVER

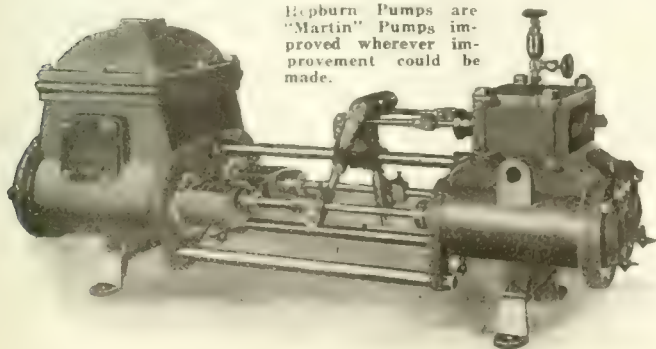
**Morse Twist Drill and Mch. Co., New Bedford, Mass., U.S.A.**

A CATALOG FREE FOR THE ASKING.

## Hepburn Pumping Machinery

Our line embraces standard duplex pumps for boiler feeding and for fire and general service; tank or low service duplex pumps; duplex hydraulic pumps for service in connection with hydraulic lifts and presses, accumulators and oil presses; pressure or mine pumps; horizontal power pumps and air and circulating pumps, etc.

Hepburn Pumps are "Martin" Pumps improved wherever improvement could be made.

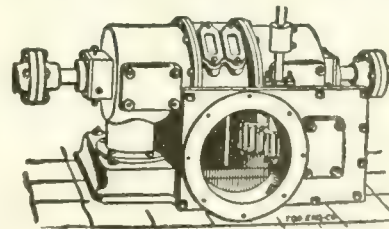


**JOHN T. HEPBURN, LIMITED**

18-60 Van Horne Street

Toronto, Ontario

## WATER POWER DEVELOPMENT



Over forty years' experience in designing and installing special turbines, both on vertical and horizontal shafts.

Can supply complete equipment, including flume, turbine and power transmission.

Stock of standard vertical shaft Little Giant Turbines on hand for prompt shipment.

We solicit your inquiries.

**THE J. C. WILSON MFG. CO.**  
LIMITED  
BELLEVILLE, ONTARIO



CANADIAN  
MACHINERY

## BUYERS' DIRECTORY

**DRILLS, PNEUMATIC CORNER**

Can. Ingersoll-Rand Co., Montreal, Que.  
Cleveland Pneumatic Tool Co. of Canada, Toronto

Garlock-Walker Machinery Co., Toronto.  
Independent Pneumatic Tool Co., Chicago.

**DRILLS, RATCHET AND HAND**

Aikenhead Hardware Co., Toronto, Ont.  
Armstrong Bros. Tool Co., Chicago, Ill.  
Can. Blower & Forge Co., Kitchener, Ont.  
Canadian Fairbanks-Morse Co., Montreal.  
Cincinnati Electrical Tool Co., Cincinnati.  
Cleveland Twist Drill Co., Cleveland.  
Garlock-Walker Mch. Co., Toronto, Ont.  
A. B. Jardine & Co., Hespeler, Ont.  
Morrow Screw & Nut Co., John, Ingersoll, Ont.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.

Priatt & Whitney Co., Dundas, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.  
Wilt Twist Drill Co. of Can., Walkerville.

**DRILLS, ROCK**

Can. Ingersoll-Rand Co., Montreal, Que.  
Cleveland Pneumatic Tool Co., Toronto.  
The Foss Mch. & Supply Co., Montreal.  
A. R. Williams Machy. Co., Toronto.

**DRILLS, TRACK**

Butterfield & Co., Inc., R. 1, Quebec.  
Cleveland Twist Drill Co., Cleveland.  
The Foss Mch. & Supply Co., Montreal.  
Morrow Screw & Nut Co., J. Ingersoll, Ont.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Wilt Twist Drill Co. of Can., Walkerville.

**DRINKING FOUNTAINS, SANITARY**  
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

**DRIVES, CHAIN**

See Belting, Chain.

**DRIVING TOOLS**

The Thos. Pink Co., Ltd., Pembroke, Ont.

**DRY CLEANING SYSTEM**

Rawson Co., Ltd., S. F. Toronto, Ont.

**DRYERS, SAND**

Pangborn Corporation, Hagerstown, Md.

**DRYING APPLIANCES**

Baird Machine Co., Bridgeport, Conn.

**DRUM CONTROLS**

Volta Manufacturing Co., Welland, Ont.

**DUMP CARS**

Canadian Fairbanks-Morse Co., Montreal.

MacKinnon Steel Co., Sherbrooke, Que.

**DUST EXHAUSTER, ARRESTER****SYSTEM**

Pangborn Corporation, Hagerstown, Md.

**DUST HANDLING EQUIPMENT**

Pangborn Corporation, Hagerstown, Md.

**DUST SEPARATORS**

Can. Blower & Forge Co., Kitchener, Ont.

**DYNAMOS AND ELECTRICAL****SUPPLIES**

Canadian Fairbanks-Morse Co., Montreal.

Laurensure Dynamo & Motor Co., Ltd., Toronto.

MacGovern & Co., Montreal, Que.

A. R. Williams Machy. Co., Toronto.

**ELECTRICAL SUPPLIES**

Can. General Electric Co., Toronto, Ont.

**ELECTRIC FURNACES**

Volta Manufacturing Co., Welland, Ont.

**ELECTRIC FURNACE REGULATORS,**

**WINCHES, ROOF COOLERS AND**

**ELECTRODE HOLDERS**

Volta Manufacturing Co., Welland, Ont.

**ELECTRICAL RESISTANCE MAT-**

**TERIALS, NICHROME, KROMORE,**

**CHROMAX, CLIMAX, NICKEL,**

**SILVER, ADVANCE.**

Can. Driver-Harris Co., Walkerville, Ont.

**ELECTRIC HOISTS, STATIONARY**

**AND MONO RAIL**

Volta Manufacturing Co., Welland, Ont.

**ELECTRIC MOTORS**

Volta Manufacturing Co., Welland, Ont.

**ELEVATOR ENCLOSURES**

Volta Mfg. Co., Welland, Ont.

Canada Wire & Iron Goods Co., Hamilton

**ELEVATOR WEIGHTS**

Katie Foundry, Galt, Ont.

**ELEVATORS AND BUCKETS**

Can. Link-Belt Co., Toronto, Ont.

Curtis Pneumatic Machy. Co., St. Louis

Williams & Wilson, Ltd., Montreal, Que.

**ELEVATING AND CONVEYING****MACHINERY**

Can. Link-Belt Co., Toronto, Ont.

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**EMBOSSING PRESSES**

Oliver Machinery Co., Grand Rapids, Mich.

**EMERY GRINDERS (PNEUMATIC)**

Cleveland Pneumatic Tool Co., Toronto.

Ford Smith Machine Co., Hamilton, Ont.

**EMERY AND EMERY WHEELS**

Brantford Emery Wheel Co., Brantford, Canada

The Foss Mch. & Supply Co., Montreal.

Garvin Machine Co., New York.

Canadian Fairbanks-Morse Co., Montreal.

Canada Emery Wheels Co., Hamilton.

Ford-Smith Mach. Co., Hamilton, Ont.

Rice Lewis & Son, Toronto, Ont.

Standard Machy. & Supplies, Montreal.

Wilkinson & Kompass, Hamilton, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**EMERY WHEEL DRESSINGS**

Wheel Trueing Tool Co., Windsor, Ont.

**END MILLS**

John Morrow Screw & Nut Co., Ingersoll

**ENGINES, STEAM, GAS, GASOLINE**

Canadian Fairbanks-Morse Co., Montreal.

Johnson Mach. Co., Carlyle, Manchester, Conn.

MacGovern & Co., Montreal, Que.

**ENGINES, HORIZONTAL AND****VERTICAL**

Johnson Mach. Co., Carlyle, Manchester, Conn.

A. R. Williams Machy. Co., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**ENGINES, MARINE**

Can. Ingersoll-Rand Co., Sherbrooke, Que.

**ENGRAVERS**

Pritchard-Andrews Co., Ottawa.

**ESCUTCHEON PINS**

Parmenter & Bulloch, Gananoque, Ont.

**EXHAUST HEADS AND HOODS**

Can. Blower & Forge Co., Kitchener, Ont.

Canadian Fairbanks-Morse Co., Montreal.

**EXHAUSTERS**

Can. Blower & Forge Co., Kitchener, Ont.

Pangborn Corporation, Hagerstown, Md.

Williams & Wilson, Ltd., Montreal, Que.

**EXTRACTORS, TAP**

Walton Co., The, Hartford, Conn.

**EYE BOLTS AND NUTS**

Can. Foundries & Forgings, Ltd., Welland, Ont.

**EYE PROTECTORS**

Standard Optical Co., Geneva, N.Y.

Strong, Kennard & Nutt Co., Cleveland.

Willson & Co., Inc., T. A., Reading, Pa.

**FACTORY GATES**

Page Steel & Wire Co., Adrian, Mich.

**FANS**

Baird Machine Co., Bridgeport, Conn.

Can. Blower & Forge Co., Kitchener, Ont.

**FENCING, WIRE**

Page Steel & Wire Co., New York, N.Y.

Williams & Wilson, Ltd., Montreal, Que.

**FENCE, IRON AND FACTORY**

Can. Wire & Iron Goods, Hamilton, Ont.

Page Steel & Wire Co., Adrian, Mich.

**FERRO-TUNGSTEN**

Vanadium-Alloys Steel Co., Pittsburgh, Pa.

**FILES**

Aikenhead Hardware Co., Toronto, Ont.

Alkins & Co., Wm., Sheffield, Eng.

Ingersoll File Co., Ltd., Ingersoll, Ont.

Morrow Screw & Nut Co., J. Ingersoll, Ont.

Marshall Son & Bunney, Toronto, Ont.

Nicholson File Co., Port Hope, Ont.

Rice Lewis & Son, Toronto, Ont.

Simonds Mfg. Co., Fitchburg, Mass.

Whitman & Barnes Mfg. Co., Akron, O.

Wilkinson & Kompass, Hamilton, Ont.

**FILTERING AND CIRCULATING**

**SYSTEMS FOR LUBRICATING OIL**

Rawson Co., Ltd., S. F. Toronto, Ont.

Can. Wire & Iron Goods, Hamilton, Ont.

**FINISHING MACHINES**

Brown & Sharpe Mfg. Co., Providence, R.I.

**FIRST AID CABINETS**

Strong, Kennard & Nutt Co., Cleveland

**FIRE EXTINGUISHERS**

Strong, Kennard & Nutt Co., Cleveland, O.

**FIXTURES**

Brown Engineering Corp., Toronto, Ont.

Elliott & Whitehall Mach. & Tool Co., Galt, Ont.

Illinois Tool Works, Chicago, Ill.

Marten Machine Co., Hamilton, Ontario.

Toronto Tool Co., Toronto, Ont.

**FLAT SPRINGS**

The Dunbar Brothers Co., Bristol, Conn.

**FLANGING CLAMPS**

Weeks Bros., Saginaw, Mich.

**FLOTATION MACHINERY**

Elec. Steel & Metals, Welland, Ont.

**FUMES**

William Hamilton Co., Peterboro, Ont.

**FORGES, HAND PORTABLE**

Aikenhead Hardware Co., Toronto, Ont.

Can. Blower & Forge Co., Kitchener

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Rice Lewis & Son, Toronto, Ont.

**FORGINGS, STEEL AND IRON**

Blancette Co., L. C., New York City.

Can. Found. & Forgings, Ltd., Welland.  
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

**FORGINGS, DROP, AUTOMOBILE AND LOCOMOTIVE FORGING AND WELDING**

Blancette Co., L. C., New York City.  
Dominion Bridge Co., Montreal, Que.  
Dom. Forge & Stamp Co., Walkerville.  
Steel Co. of Canada, Ltd., St. Catharines.  
Victoria Foundry Co., Ottawa.  
Williams & Co., J. H., Brooklyn, N.Y.

**FORGING MACHINERY**

John Bestman & Sons Co., Dunlas, Ont.  
Hess, E. W., Co., Brooklyn, N.Y.  
Brown, James Co., Ltd., Hamilton, Ont.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machy. Co., Toronto, Ont.  
National Machy. Co., Tiffin, Ohio.  
Williams & Wilson, Ltd., Montreal, Que.

**FORGINGS, SPECIAL**

Armstrong-Whitworth of Can., Montreal.  
Blancette Co., L. C., New York City.  
Can. Found. & Forgings, Ltd., Welland.  
Williams & Co., J. H., Brooklyn, N.Y.

**FORMING**

Brown & Sharpe Mfg. Co., Providence, R.I.

**FOUNTAINS, DRINKING**

Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

**FRICTION LEATHERS**

Graton & Knight Mfg. Co., Montreal.

**FRICTION SURFACE BELTING**

Can. Consolidated Rubber Co., Montreal.

**FUEL OIL SYSTEMS**

Rawson Co., Ltd., S. F. Toronto, Ont.  
Gilbert & Barker Mfg. Co., Springfield.

**FURNACES, ANNEALING, CASE**

**HARDENING AND TEMPERING**

Bellevue Furnace Co., Detroit, Mich.

Brown & Sharpe Mfg. Co., Providence, R.I.

Chicago Flexible Shaft Co., Chicago, Ill.

Gilbert & Barker Mfg. Co., Springfield.

Mechanical Engr'g Co., Three Rivers, Q.

Standard Fuel Engr. Co., Detroit, Mich.

Williams & Wilson, Ltd., Montreal, Que.

**FURNACES, BLAST**

Bellevue Industrial Furnace Co., Detroit.

Toronto Lion Works, Ltd., Toronto.

**FURNACES, FORGING**

Gilbert & Barker Mfg. Co., Springfield.

**FUSE BOXES, STEEL**

Dom. Forge & Stamp Co., Walkerville.

**GANG PLANER TOOLS**

Armstrong Bros. Tool Co., Chicago.

**GASKETS, LEATHER, ETC.**

Graton & Knight Mfg. Co., Montreal.

**GASOLINE METERS**

Rawson Co., Ltd., S. F. Toronto, Ont.

**GASOLINE TANKS**

Rawson Co., Ltd., S. F. Toronto, Ont.

**GASOLINE PUMPS, SELF-MEASURING**

Rawson Co., Ltd., S. F. Toronto, Ont.

Brown & Sharpe Mfg. Co., Providence, R.I.

**GAUGES**

Elliott & Whitehall Mach. & Tool Co., Galt, Ont.

**GAUGERS, CALIPERS**

Williams & Co., J. H., Brooklyn, N.Y.

**GAUGES, MERCURY COLUMN, DRAFT**

Taylor Instrument Co., Rochester, N.Y.

**GAUGES, HYDRAULIC**

Taylor Instrument Co., Rochester, N.Y.

**GAUGES, MANUFACTURERS, LIMIT, THREAD**

Greenfield Tap & Die Corp., Greenfield.

Wells Bros. of Can., Galt, Ont.

**GAUGES, STANDARD**

Brown Engineering Corp., Toronto, Ont.

Canadian Fairbanks-Morse Co., Montreal.

Cleveland Twist Drill Co., Cleveland.

Garvin Machine Co., New York.

Illinois Tool Works, Chicago, Ill.

C. E. Johanson, Inc., Toronto, Ont.

Morse Twist Drill & Machine Co., New Bedford.

Peck, Stow & Wilcox Co., Southington, Conn.

Priatt & Whitney Co., Hartford, Conn.

Taylor, J. A. M., 318 Stair Bldg., Toronto

Toronto Tool Works, Toronto, Ont.

Wells Brothers Co. of Canada, Galt, Ont.

Worth Engineering Co., Toronto, Ont.

**GAUGES, THREAD**

Bicknell-Thomas Co., Greenfield, Mass.

**GAUGES, VACUUM AND PRESSURE**

Bristol Co., Waterbury, Conn.

Taylor Instrument Co., Rochester, N.Y.

**GAUGES, SNAP, THREAD AND CYLINDRICAL**

C. E. Johanson, Inc., Toronto, Ont.

**GEAR BLANKS**

Can. Steel Foundries, Ltd., Montreal.

Dom. Found. & Steel, Hamilton, Ont.

Karper-Ellison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.



## How The Gear Shaper Cuts Accurate Gears

The cutting of accurate gears is not only a question of having an accurate machine and an accurate cutter, but is also a question of the proper application of basic principles in the machine itself.

Gears in which the teeth are not cut concentric with the holes are inaccurate. They are also noisy in operation.

Spur gears in which the teeth do not lie exactly parallel with the axis are also inaccurate and noisy.

In order, therefore, to cut accurate gears, it is necessary that the gears being cut be accurately and rigidly held.

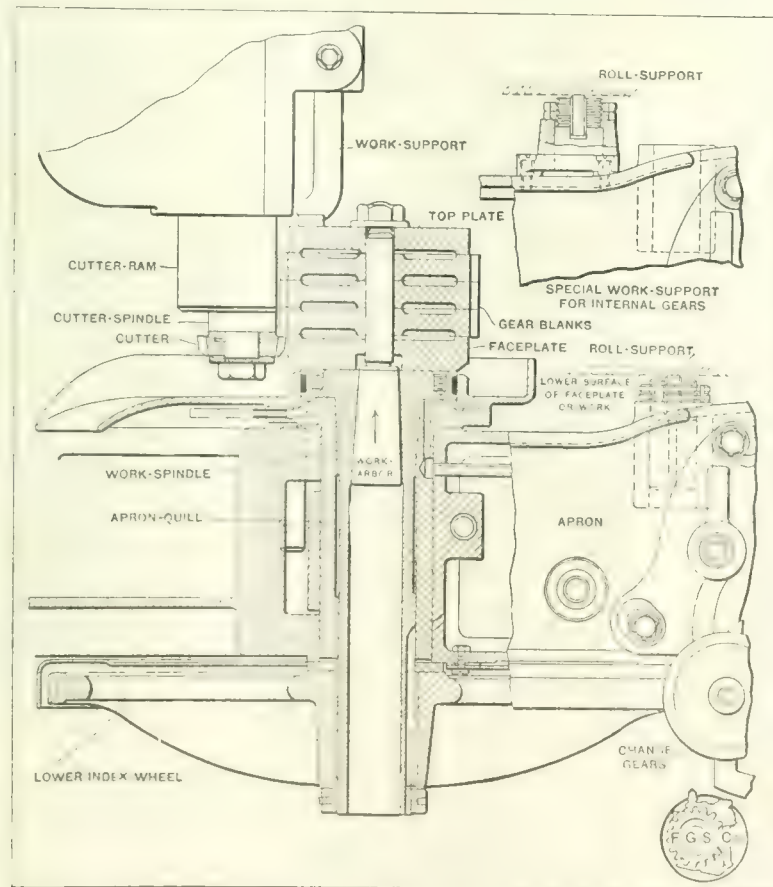
The Gear Shaper method of supporting gears is unique in that the work can be clamped rigidly without springing the work-arbor; also the cutter does not deflect the work when the teeth are being generated.

The accompanying diagram illustrates this point very clearly. The work, it will be noticed, is clamped rigidly to a face-plate. All the arbor does is simply to center the work accurately and furnish the clamping medium.

The tighter the work is clamped, the more rigidly the arbor is held in the spindle, because it has a reverse taper. There is, therefore, no possibility of deflecting the work in cutting, as is the case with other processes where the work is supported by a long slender arbor.

One of the chief advantages of this unique method of supporting the work is that the work can be cut much faster and with a greater degree of accuracy than is possible by any other method.

It will pay you to investigate the many advantages of the Gear Shaper method of cutting gears, which is fully explained in the sixth edition of our general catalogue



Section through work-spindle showing rigid method of holding and supporting Gear Blank.

logue "Commercial Gear Cutting," copies of which are ready for general distribution to those interested. Simply send your request to—

**The F. G. S. C. Gear Shaper Company**  
Springfield, Vermont, U.S.A.

FOREIGN AGENTS: Alfred Herbert, Limited, Coventry, England; Societe Anonyme Alfred Herbert, 47 Boulevard de Magenta, Paris, France; Societa Anonima Italiana Alfred Herbert, 42 via Cavour, Milan, Italy; Alfred Herbert, Limited, 14 Yamashita-cho, Yokohama, Japan; Societe Anonyme Alfred Herbert, Calle de Mallorca No. 270, Barcelona, Spain; Societe Anonyme Belge Alfred Herbert, 35 Rue de Laeken, Brussels, Belgium; Alfred Herbert, Limited, 13 British India Street, Calcutta, India; and A. B. Galeo, Limited, Stockholm, Sweden.



Cleveland Pneumatic Tool Co., Toronto.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Garlock-Walker Machinery Co., Toronto.  
Katie Foundry, Galt, Ont.  
Modern Tool Co., Erie, Pa.  
Morse Twist Drill & Machine Co., New Bedford.  
Niles-Bement-Pond Co., New York, N.Y.  
Perfect Machine Co., Galt, Ont.  
United States Elec. Tool Co., Cincinnati.  
Williams & Wilson, Limited, Montreal.

**GRINDERS, CUTTER**

Brown & Sharpe Mfg. Co., Providence, R.I.  
Cincinnati Milling Mach. Co., Cincinnati.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Garvin Machine Co., New York.  
Greenfield Machine Co., Greenfield, Mass.  
Greenfield Tap & Die Corp., Greenfield, M.  
Heald Machine Co., Worcester, Mass.  
Landis Tool Co., Waynesboro, Pa.  
Norton Co., Worcester, Mass.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Can., Galt, Ont.  
Williams & Wilson, Ltd., Montreal.

**GRINDERS, DIE AND CHASER**  
Landis Machine Co., Waynesboro, Pa.  
Modern Tool Co., Erie, Pa.  
National-Acme Co., Cleveland, Ohio.

**GRINDERS, DISK**

Armstrong Bros. Tool Co., Chicago, Ill.  
Ford-Smith Mach. Co., Hamilton.  
Gardner Machine Co., Beloit, Wis.  
Heald Machine Co., Worcester, Mass.

**GRINDERS, DRILL**

Aikenhead Hardware Co., Toronto.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Garvin Machine Co., New York.  
Greenfield Tap & Die Corp., Greenfield.  
United States Elec. Tool Co., Cincinnati.  
Wells Bros. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal.

**GRINDERS, CYLINDER, INTERNAL**  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Greenfield Machine Co., Greenfield, Mass.  
Heald Machine Co., Worcester, Mass.  
Landis Tool Co., Waynesboro, Pa.  
Modern Tool Co., Erie, Pa.  
Norton Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal.

**GRINDERS, PORTABLE, ELECTRIC, HAND, TOOL POST, FLOOR AND BENCH**

Baird Machine Co., Bridgeport, Conn.  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Cincinnati Electrical Tool Co., Cincinnati.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Wisconsin Electric Co., Inc., Racine, Wis.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Grant Mfg. & Mach. Co., Bridgeport, Conn.  
Garlock-Walker Machinery Co., Toronto.  
Greenfield Machine Co., Greenfield, Mass.  
Independent Pneumatic Tool Co., Chicago.  
United States Elec. Tool Co., Cincinnati.  
Williams & Wilson, Ltd., Montreal.  
Wilkinson & Kompass, Hamilton, Ont.

**GRINDERS, MANUFACTURING**  
Universal Grinding Mach. Co., Fitchburg, Mass.

**GRINDERS, HOLE, HOLE AND FACE AND DEEP HOLE**  
Bryant Chucking Grinder Co., Springfield, Vermont.  
Heald Machine Co., Worcester, Mass.

**GRINDERS, PLAIN CYLINDRICAL**  
Fitchburg Grinding Mach. Co., Fitchburg, Mass.

**GRINDERS, PNEUMATIC**  
Can. Ingersoll-Rand Co., Montreal.  
Cleveland Pneumatic Tool Co., Toronto.  
Garlock-Walker Machinery Co., Toronto.  
Heald Machine Co., Worcester, Mass.  
Independent Pneumatic Tool Co., Chicago.  
MacGovern & Co., Montreal, Que.

**GRINDERS, ROTARY SURFACE**  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Bristol Machine Tool Co., Bristol, Conn.

**GRINDERS, TOOL AND HOLDER**  
Armstrong Bros. Tool Co., Chicago.  
W. F. & John Barnes Co., Rockford, Ill.  
Blount & Co., J. G., Everett, Mass.  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Ford-Smith Machine Co., Hamilton, Ont.  
Greenfield Machine Co., Greenfield, Mass.  
National-Acme Co., Cleveland, Ohio.  
Tabor Mfg. Co., Philadelphia, Pa.  
Wells Bros. of Canada, Galt, Ont.

**GRINDERS, UNIVERSAL, PLAIN**  
Modern Tool Co., Erie, Pa.  
Norton Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal.

**GRINDERS, VERTICAL SURFACE**  
Brown & Sharpe Mfg. Co., Providence, R.I.  
Can. Fairbanks-Morse Co., Montreal.  
Heald Machine Co., Worcester, Mass.  
Pratt & Whitney Co., Dundas, Ont.  
Gisholt Machine Co., Madison, Wis.  
Norton Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal.

**GRINDING AND POLISHING MACHINES, PORTABLE, PNEUMATIC AND SPRING FRAME**

Can. Fairbanks-Morse Co., Montreal.  
Cincinnati Elec. Tool Co., Cincinnati, O.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Gardner & Son, Robt., Montreal.  
Garvin Machine Co., New York.  
Garlock-Walker Machinery Co., Toronto.  
Greenfield Machine Co., Greenfield, Mass.  
Hall & Sons, John H., Brantford, Ont.  
LeBlond Mch. Tool Co., R. K., Cincinnati.  
Niles-Bement-Pond Co., New York, N.Y.  
Norton Co., Worcester, Mass.  
Wisconsin Electric Co., Racine, Wis.  
Williams & Wilson, Ltd., Montreal.

**GRINDING MACHINES, CAR WHEEL, CUTTER, CYLINDRICAL, CRANKSHAFT**

Brown & Sharpe Mfg. Co., Providence, R.I.  
Norton Co., Worcester, Mass.

**GRINDING WHEELS**

Aikenhead Hardware Co., Toronto, Ont.  
Brantford Emery Wheel Co., Brantford, Can.  
Fairbanks-Morse Co., Montreal.  
Ford-Smith Machine Co., Hamilton, Ont.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Norton Co., Worcester, Mass.

**GUARDS, WINDOW AND MACHINE**  
Canada Machinery Corp., Galt, Ont.  
Canada Wire & Iron Goods Co., Hamilton.  
Dennis Wire & Iron Works, London, Ont.  
Page Steel & Wire Co., Adrian, Mich.  
Strong, Kennard & Nutt Co., Cleveland.

**HANDLES, BALANCE, CRANK AND MACHINE**  
Williams & Co., J. H., Brooklyn, N.Y.

**GUTTERS AND SKYLIGHTS**

H. H. Robertson, Ltd., Sarnia, Ont.

**HACK SAW BLADES**

Aikenhead Hardware Co., Toronto, Ont.  
Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Baker & Co., Inc., New York, City.  
Baker & Co., Inc. H., Montreal, Que.  
Can. Fairbanks-Morse Co., Montreal.  
Diamond Saw & Stamping Wks., Buffalo.  
Ford-Smith Machine Co., Hamilton, Ont.  
Kaiser-Elison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto.  
Norton, Ralph B., Agent, Montreal.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Fry's (London), Ltd., London, England.  
Racine Tool & Machine Co., Racine, Wis.  
Pewees, Ltd., Winnipeg, Man.  
Pilot Steel & Tool Co., Montreal, Que.  
Rice Lewis & Son, Toronto, Ont.  
Simonds Mfg. Co., Fitchburg, Mass.  
L. S. Starrett Co., Attn., Mass.  
Standard Machy. & Supplies, Montreal.  
Victor Saw Works, Ltd., Hamilton.  
Wilkinson & Kompass, Hamilton.  
Williams & Wilson, Ltd., Montreal.

**HACK SAW FRAMES**

Aikenhead Hardware Co., Toronto.  
Can. Fairbanks-Morse Co., Montreal.  
Ford-Smith Machine Co., Hamilton, Ont.  
Garvin Machine Co., New York City.  
Victor Saw Works, Hamilton, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Wilkinson & Kompass, Hamilton, Ont.  
Williams & Wilson, Ltd., Montreal.

**HACK SAWS, POWER**

Aikenhead Hardware Co., Toronto, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Diamond Saw & Stamping Wks., Buffalo.  
Foss Mch'y. & S'ply. Co., G. F., Montreal.  
Ford-Smith Machine Co., Hamilton.  
Peerless Machine Co., Racine, Wis.  
Racine Tool & Mach. Co., Racine, Wis.  
Starrett Co., L. S., Athol, Mass.  
Victor Saw Works, Hamilton, Ont.  
Williams & Wilson, Ltd., Montreal.

**HAMMERS, HATCHETS**

Whitman & Barnes Co., St. Catharines.

**HAMMERS (DROP), MOTOR AND BELT DRIVEN**

Beaudry & Co., Boston, Mass.  
Bliss Co., E. W., Brooklyn, N.Y.  
Brown, Rogers Co., Ltd., Hamilton.  
Can. Billings & Spencer, Ltd., Welland.  
Canada Machinery Corp., Galt, Ont.  
High Speed Hammer Co., Rochester, N.Y.  
Jardine & Co., A. B., Hespeler, Ont.  
Niles-Bement-Pond Co., New York, N.Y.  
Toledo Machine & Tool Co., Toledo.  
United Hammer Co., Boston, Mass.  
Williams & Wilson, Ltd., Montreal.

**HAMMERS, HELVE POWER**

Canada Machinery Corp., Galt, Ont.  
West Tire Setter Co., Rochester, N.Y.  
Williams & Wilson, Limited, Montreal.

**HAMMERS, CHIPPING, CAULKING, PNEUMATIC**  
Can. Ingersoll-Rand Co., Montreal, Que.  
Garlock-Walker Machinery Co., Toronto.  
Independent Pneumatic Tool Co., Chicago.

**HAMMERS, MARKING**

Matthews & Co., Jas. H., Pittsburgh, Pa.

**HAMMERS, NAIL MACHINE**

Rice Lewis & Son, Toronto, Ont.  
United Hammer Co., Boston, Mass.

**HAMMERS, STEAM**

Canada Machinery Corp., Galt, Ont.  
Niles-Bement-Pond Co., New York

**HAND PLANERS**

Oliver Mch'ry. Co., Grand Rapids, Mich.

**HAND LEATHERS OR PADS**

Graton & Knight Mfg. Co., Montreal.

**HANGERS**

Brown & Sharpe Mfg. Co., Providence, R.I.

**HANGERS, SHAFT**

Algoma Steel Corp., Sault Ste. Marie.  
Can. General Electric Co., Toronto, Ont.  
Chapman Double Ball Bearing Co., Toronto.  
Gray Ball Bearing Co., Ltd., Toronto.  
Baird Machine Co., Bridgeport, Conn.  
Can. S K F Co., Toronto, Ont.  
Gardner & Son, Robt., Montreal.  
Jones & Glasco, Montreal.  
Standard Pressed Steel Co., Philadelphia.  
Williams & Wilson, Limited, Montreal.

**HARDNESS TESTING INSTRUMENTS**

Shore Instrument & Mfg. Co., New York

**HEAD, AUXILIARY**

Hoefler Mfg. Co., Freeport, Ill.

**HEATING AND VENTILATING ENGINEERS**

Can. Blower & Forge Co., Kitchener, Ont.

**HEAT TREATMENT OF STEEL**

Gray Ball Bearing Co., Ltd., Toronto.

**HEAT GAUGES, HARDENING AND ANNEALING**

Shore Instrument & Mfg. Co., New York

**HELMETS, SANDBLAST, AMMONIA**  
Strong, Kennard & Nutt Co., Cleveland

**HIGH SPEED STEEL**

See Steel.

**HINGE MACHINERY**

Baird Machine Co., Bridgeport, Conn.  
Illinois Tool Works, Chicago, Ill.

**HINGES**

London Bolt & Hinge Wks., London, Ont.

**HOBS**

Greenfield Tap & Die Co., Greenfield, Mass.  
Illinois Tool Works, Chicago, Ill.  
Pratt & Whitney Co., Dundas, Ont.  
Taylor, J. A. M., 318 Starr Bldg., Toronto.  
Wells Bros. of Canada, Galt, Ont.

**HOISTS, AIR**

Can. Ingersoll-Rand Co., Ltd., Sherbrooke.  
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

**HOISTS, CHAIN AND PNEUMATIC**

Can. Ingersoll-Rand Co., Montreal, Que.  
Garlock-Walker Machinery Co., Toronto.  
Ford Chain Block & Mfg., Philadelphia.  
Independent Pneumatic Tool Co., Chicago.  
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.  
Northern Crane Works, Walkerville, Ont.  
Wright Mfg. Co., Lisbon, Ohio.  
Williams & Wilson, Limited, Montreal.

**HOISTS, ELECTRICAL**

Can. Link-Belt Co., Toronto, Ont.  
Dominion Bridge Co., Montreal, Que.  
Electric Steels & Metals Ltd., Welland.  
Kennedy & Sons, Owen Sound, Ont.  
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.  
Northern Crane Works, Walkerville, Ont.  
Williams & Wilson, Limited, Montreal.

**HOISTS, ELEC., STATIONERY, MONO RAIL**

Volta Mfg. Co., Welland, Ont.

**HOLDERS, STEEL DIE FOR MARKING**

Matthews & Co., Jas. H., Pittsburgh, Pa.

**HOLDERS, ELECTRIC**

Electric Steels & Metals, Ltd., Welland

**HOOKS, BELT LACING**

Clipper Belt Lacer Co., Grand Rapids.

**HOPPERS**

MacKinnon Steel Co., Ltd., Sherbrooke.  
Dominion Bridge Co., Montreal, Que.  
William Hamilton Co., Peterboro, Ont.  
Toronto Iron Works, Ltd., Toronto, Ont.

**HOSE, PNEUMATIC**

Cleveland Pneumatic Tool Co. of Canada.  
Toronto.  
Garlock-Walker Machinery Co., Toronto.  
Independent Pneumatic Tool Co., Chicago.  
Wells Bros. Co. of Canada, Galt, Ont.

**HOSE, ALL KINDS**

Int Mach. & Supply Co., Ltd., Montreal.

**HOSE, SAND BLAST**

Pangborn Corporation, Hagerstown, Md.

**HYDRAULIC MACHINERY**

Garlock-Walker Machinery Co., Toronto.  
Metalwood Mfg. Co., Detroit, Mich.  
Niles-Bement-Pond Co., New York.  
Perrin, Ltd., William R., Toronto.  
West Tire Setter Co., Rochester, N.Y.

Victoria Foundry Co., Ottawa.  
Williams & Wilson, Limited, Montreal.

**HYDROMETERS, HYGROMETERS, HYGRODEKS**

Taylor Instrument Co., Rochester, N.Y.

**INDICATORS, SPEED**

Aikenhead Hardware Co., Toronto, Ont.  
Brown & Sharpe Mfg. Co., Providence.  
Starrett Co., L. S., Athol, Mass.

**INDEX CENTRES**

Brown & Sharpe Mfg. Co., Providence, R.I.  
Dickow, Fred C., Chicago, Ill.  
Ford-Smith Machine Co., Hamilton, Ont.  
Garvin Machine Co., New York.  
Williams & Wilson, Limited, Montreal.

**INDICATING INSTRUMENTS**  
Taylor Instrument Co., Rochester, N.Y.

**INGOT METAL**

Brown's Copper & Brass Rolling Mills.  
New Toronto, Ont.

**INGOTS, STEEL**

Nova Scotia Stl. & Coal Co., New Glasgow

**INGOTS, FORGING AND ROLLING**  
Electric Steel & Metals Co., Welland.

**INSULATING COMPOUNDS**

H. H. Robertson Co., Ltd., Sarnia, Ont.

**INSTRUMENTS, ENGINEERING**  
Consolidated Optical Co., Toronto.

**IRON ORE**

Hanna & Co., M. A., Cleveland, O.

**IRON, WROUGHT, ROLLED, PIG**  
Swedish Steel & Impt. Co., Ltd., Montreal

**JACKS**

Aikenhead Hardware Co., Toronto, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.  
Northern Crane Works, Walkerville.  
Norton, A. O., Coaticook, Que.  
Rice Lewis & Son, Toronto, Ont.  
Williams & Wilson, Limited, Montreal.

**JACKS, PIT AND TRACK**  
Canadian Fairbanks-Morse Co., Montreal.  
Northern Crane Works, Walkerville.

**JAWS, FACE PLATE**

Oushman Chuck Co., Hartford, Conn.  
Skinner Chuck Co., New Britain, Conn.

**JOINTERS**

Gray Ball Bearing Co., Ltd., Toronto.

**JIGS, TOOLS, ETC.**

Brown Engineering Corp., Toronto.  
Elliott & Whitehall Mach. & Tool Co., Galt.  
Gisholt Machine Co., Madison, Wis.  
Homer & Wilson, Hamilton, Ont.  
Illinois Tool Works, Chicago, Ill.  
Marten Machine Co., Hamilton, Ont.  
Toronto Tool Co., Toronto, Ont.

**JOURNAL WEDGES**

Canada Foundries & Forgings, Welland.

**KEY SEATERS**

Garlock-Walker Machy. Co., Toronto, Ont.  
Garvin Machine Co., New York.  
Morton Mfg. Co., Muskegon Heights, M.  
A. R. Williams Machy. Co., Toronto.  
Williams & Wilson, Ltd., Montreal.

**KEYS, MACHINE**

Whitney Mfg. Co., Hartford, Conn.  
Williams & Co., J. H., Brooklyn, N.Y.

**KILNS**

Can. Blower & Forge Co., Kitchener, Ont.  
Kennedy & Sons, Wm., Owen Sound, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.

**KNIFE GRINDERS**

Gray Ball Bearing Co., Ltd., Toronto.

**LABELS AND TAGS**

Matthews & Co., Jas. H., Pittsburgh, Pa.

**LABORATORIES, INSPECTION AND TESTING (See Chemists)**

**LADLES, FOUNDRY**

Northern Crane Works, Walkerville.

**LACING MACHINES**

Clipper Belt Lacer Co., Grand Rapids, M.

**LAMPS, ARC, INCANDESCENT**  
Can. General Electric Co., Toronto, Ont.

**LAMPS, TUNGSTEN AND NITRO**  
Can. General Electric Co., Toronto, Ont.

**LAG SCREW GIMLET POINTERS**  
National Machy. Co., Tiffin, Ohio.

**LATH**

H. H. Robertson, Ltd., Sarnia, Ont.

**LATHES, CHUCKING**

Acme Machine Tool Co., Cincinnati, Ohio.  
Wood Turret Machine Co., Brazil, Ind.  
Williams & Wilson, Limited, Montreal.

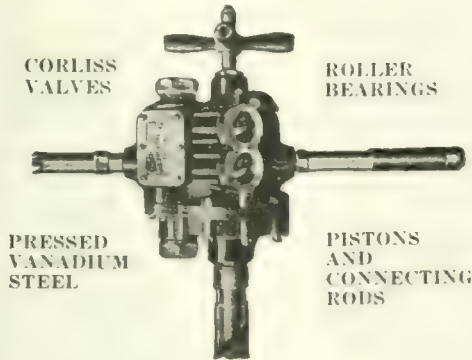
**LATHE CHUCKS (See Chucks)**

**LATHE DOGS AND ATTACHMENTS**  
Armstrong Bros. Tool Co., Chicago.  
Curtis & Curtis Co., Bridgeport, Conn.



# PNEUMATIC TOOLS

## AIR DRILLS



Four cylinders—two on each side—with Semi-Corliss Valve close to each pair, giving greater power and efficiency.

# Thor

**ALL RECORDS  
BROKEN FOR  
SPEED, POWER  
and ENDURANCE**

## CHIPPING HAMMERS

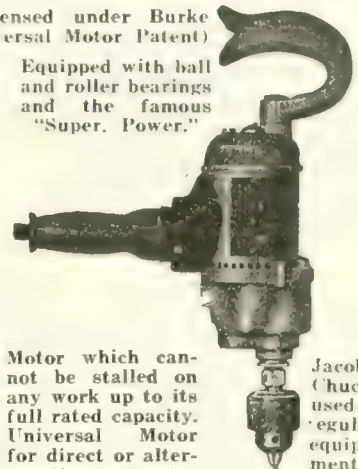


4 sizes, 1 in. to 5 in.  
All parts hardened and ground.

# ELECTRIC DRILLS

(Licensed under Burke  
Universal Motor Patent)

Equipped with ball  
and roller bearings  
and the famous  
"Super. Power."



Motor which can-  
not be stalled on  
any work up to its  
full rated capacity.  
Universal Motor  
for direct or alter-  
nating current.

Jacob's  
Chucks  
used as  
regular  
equip-  
ment.

*For Full Particulars Write--*

## Independent Pneumatic Tool Company

334 St. James St.

- Montreal

TORONTO: 32 Front Street W.

WINNIPEG: 123 Bannatyne Ave. E.

VANCOUVER: 1142 Homer Street

# The

# BARNES



# DRILLS



Complete line. 8-inch to 50-inch swing  
**Gang Drills.—Horizontal Drills.**

SEND FOR CATALOG.

**W. F. & JOHN BARNES CO.**

104 Ruby Street - ROCKFORD, ILL.

Canadian Agents—A. R. WILLIAMS MACHINERY CO.  
Toronto, Winnipeg, Vancouver, and St. John, N.B.  
WILLIAMS & WILSON, Montreal

## Production of Rare Quality at Lowest Labor Costs



There is unusual  
strength, accuracy,  
speed, convenience and  
range in

## AURORA Drilling Machines

You can use them  
to great advantage  
on any work in your  
shop that's suitable  
for a machine tool  
of this kind. The  
operating is easy  
and the labor cost  
comparatively low.

Drop a line for full particulars and specifications.  
Stationary Head Sizes 20"—21"  
Sliding Head Sizes 22"—44"

**The Aurora Tool Works**  
AURORA, INDIANA, U.S.A.



## CANADIAN MACHINERY

Hendey Machine Co., Torrington, Conn.  
Williams & Co., J. H., Brooklyn, N.Y.

### LATHES, AUTOMATIC AND SEMI-AUTOMATIC

Gisholt Machine Co., Madison, Wis.  
Wood Turret Machine Co., Brazil, Ind.

### LATHES, AXLE

Bridgeford Mach. Tool Works, Rochester.

### LATHES, BORING

Bridgeford Mach. Tool Works, Rochester.  
Lodge & Shipley, Cincinnati, O.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, PRECISION, BENCH

W. F. & John Barnes Co., Rockford.  
J. G. Blount & Co., Everett, Mass.  
Canadian Fairbanks-Morse Co., Montreal.  
Geo. F. Foss Machy. & Supply Co., Montreal.  
Garlock-Walker Machinery Co., Toronto.  
Hardinge Bros., Chicago, Ill.  
Pratt & Whitney Co., Dundas, Ont.  
Seneca Falls Mfg. Co., Seneca Falls, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, BRASS

Acme Machine Tool Co., Cincinnati, Ohio.  
Hardinge Bros., Chicago, Ill.  
Wood Turret Machine Co., Brazil, Ind.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, ENGINE

Acme Machine Tool Co., Cincinnati, Ohio.  
John Bertram & Sons Co., Dundas.  
Bridgeford Mach. Tool Works, Rochester.  
Canada Machy Corp., Galt, Ont.  
Canadian Fairbanks-Morse Co., Montreal.  
Cisco Machine Tool Co., Cincinnati, Ohio.  
Wickes Bros., Saginaw, Mich.  
G. F. Foss Machy. & Supply Co., Montreal.  
Garlock-Walker Machinery Co., Toronto.  
Garvin Machine Co., New York.  
Gisholt Machine Co., Madison, Wis.  
Kennedy & Sons, Wm., Owen Sound, Ont.  
R. McLaughlin Co., Galt.  
Miles-Bement-Pond Co., New York.  
Rae Brothers, Hamilton, Ont.  
Smalley-General Co., Inc., Bay City, Mich.  
Seneca Falls Mfg. Co., Seneca Falls, N.Y.  
Sidney Tool Co., Sidney, Ohio.  
Walcott Lathe Co., Jackson, Mich.  
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.  
A. R. Williams Machy. Co., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.  
Worcester Lathe Co., Worcester, Mass.

### LATHES, FOOT POWER

Seneca Falls Mfg. Co., Seneca Falls, N.Y.

### LATHES, HORIZONTAL

Wood Turret Machine Co., Brazil, Ind.

### LATHES, JOURNAL TRUEING

Bridgeford Mach. Tool Works, Rochester.

### LATHES, PATTERNMAKERS'

J. G. Blount Co., Everett, Mass.  
Can. Machinery Corp., Galt.  
Wood Turret Machine Co., Brazil, Ind.  
G. F. Foss Machy. & Supply Co., Montreal.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, POLISHING

Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, SCREW CUTTING

Bertram & Sons Co., John, Dundas, Ont.  
Bridgeford Mach. Tool Works, Rochester.  
Canada Machinery Corp., Galt, Ont.  
Cisco Machine Tool Co., Cincinnati, O.  
Foss Machy. & Supply Co., G. F., Montreal.  
Forster Machine Co., Elkhart, Ind.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Hardinge Bros., Inc., Chicago, Ill.  
Herburt Ltd., John T., Toronto, Ont.  
Niles-Bement-Pond Co., New York.  
Rae Brothers, Hamilton, Ont.  
Seneca Falls Mfg. Co., Seneca Falls, N.Y.  
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.  
Wickes Bros., Saginaw, Mich.  
Williams Machy. Co., A. R., Toronto.  
Wood Turret Machine Co., Brazil, Ind.  
Worcester Lathe Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, SPINNING

Buss Co., E. W., Brooklyn, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.

### LATHES, TOOL ROOM

Cisco Machine & Tool Co., Cincinnati, O.  
Rae Brothers, Hamilton, Ont.  
Seneca Falls Mfg. Co., Seneca Falls, N.Y.  
Worcester Lathe Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal, Que.

### LEAD BURNING

St. Lawrence Welding Co., Montreal

### LEAD BURNING OUTFITS

Turner Brass Works, Sycamore, Ill.

### LEATHER STRAPPING

Graton & Knight Mfg. Co., Worcester, M.

### LENSES FOR GOGGLES

Standard Optical Co., Geneva, N.Y.

### LIDS, SCREW TOP AND HINGE

Can. Winkley Co., Ltd., Windsor, Ont.

### LINK BELTING

See Belting, Chain.

### LINOLEUM MILL MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.

# BUYERS' DIRECTORY

## LOCKERS, STEEL WARDROBE

AND STEEL MATERIAL  
Canada Wire & Iron Gds. Co., Hamilton  
Dennie Wire & Iron Works, London, Ont.

## LUBRICATORS

Oshatrac Refining & Mfg. Co., Toronto.

## LUBRICATING, OIL FILTERING AND CIRCULATING SYSTEMS

Bowser Co., Ltd., S. F., Toronto, Ont.

## LUBRICATORS

Trabern Pump Co., Rockford, Ill.

## LUMBERMEN'S TOOLS

Thos. Pink Co., Ltd., Pembroke, Ont.

## MACHINE COUNTER WEIGHTS

Katie Foundry, Galt, Ont.

## MACHINE TOOLS

Rae Brothers, Hamilton, Ont.

## MACHINERY, CORNER AND BENDING

Peck, Stow & Wilcox, Scarborough, Conn.

## MACHINERY DEALERS

Archibald & Co., Chas. P., Montreal.  
Can. Fairbanks-Morse Co., Montreal.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Foss Machy. & Supply Co., G. F., Montreal.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MACHINERY GUARDS (See Guards)

## MACHINISTS' TOOLS

Brown & Sharpe Mfg. Co., Providence, R.I.

## MAGNETIC BRAKES FOR ELECTRIC MOTORS

Volta Mfg. Co., Welland, Ont.

## MANDRELS

Can. Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Jardine & Co., A. B., Hespeler, Ont.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Pratt & Whitney Co., Dundas, Ont.

## MARKING DEVICES

Pritchard-Andrews Co. of Can., Ottawa.  
Matthews & Co., Jas. H., Pittsburgh, Pa.

## MARKING MACHINERY

Brown, Rogers Co., Hamilton, Ont.  
Foss Machy. & Supply Co., G. F., Montreal.  
Perrin, Wm. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MASKS, WELDING, SMOKE, FUME, GAS, ETC.

Strong, Kennard & Nutt Co., Cleveland

## MEASURING MACHINES

Pratt & Whitney Co., Dundas, Ont.

## MEASURES, REGISTERING

Brown & Sharpe Mfg. Co., Providence, R.I.

## MEASURING TAPES AND RULES

Chesterman & Co., Jas., Sheffield, Eng.

## METALLURGISTS

See Chemists.

## METAL SAWS

See Saws.

## METAL SAWS, POWER

Hoefer Mfg. Co., Freeport, Ill.

## METALS

Brown's Copper & Brass Rolling Mills,  
New Toronto, Ont.  
Canada Metal Co., Toronto, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Standard Machy. & Supplies, Montreal.

## METAL, STAMPINGS, SMALL

Can. Winkley Co., Ltd., Windsor, Ont.

## METERS, OIL, GASOLINE, KERO- SENE, ETC.

Pratt & Whitney Co., Dundas, Ont.

## MICROMETERS

Almond Mfg. Co., Ashburnham, Mass.  
Taylor, J. A. M., 318 Stair Bldg., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLS, BRACE AND TUBE

Elec. Steel & Metals, Welland, Ont.

## MILLS, SAND

Frost Mfg. Co., Chicago, Ill.

## MILL MACHINERY

Alexander Fleck, Ltd., Ottawa.  
Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.

## MILLING ARBORS

Brown & Sharpe Mfg. Co., Providence, R.I.  
Kearney & Trecker Co., Milwaukee, Wis.

## MILLING ATTACHMENTS

Becker Milling Machine Co., Boston, Mass.  
Bertram & Sons Co., John, Dundas, Ont.  
Brown & Sharpe Mfg. Co., Providence.  
Canada Machinery Corp., Galt, Ont.  
Cincinnati Milling Machine Co., Cincinnati.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Foss Machy. & Supply Co., G. F., Montreal.  
Hardinge Bros., Inc., Chicago, Ill.  
Hendey Mach. Co., Torrington, Conn.  
Hinckley Machine Works, Hinckley, Wis.  
Kearney & Trecker Co., Milwaukee, Wis.  
Kemp-Smith Mfg. Co., Milwaukee, Wis.  
Niles-Bement-Pond Co., New York.

Pratt & Whitney Co., Dundas, Ont.  
Taft-Peirce Mfg. Co., Woonsocket, R.I.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING MACHINES, AUTOMATIC

Hilton Mach. Tool Co., Bridgeport, Conn.

Brown & Sharpe Mfg. Co., Providence, R.I.

Betts Machine Co., Rochester, N.Y.

Williams & Wilson, Ltd., Montreal, Que.

## MILLING CUTTERS

Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Blancete & Co., Inc., New York City.  
Blancete & Co., Inc., New York City.  
Cleveland Milling Machine Co., Cleveland.  
Kearney & Trecker Co., Milwaukee, Wis.  
Marshall, Son & Bunney, Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING MACHINES, HAND

Bristol Machine Tool Co., Bristol, Conn.

## MILLING MACHINES, THREAD

Gisholt Machine Co., Madison, Wis.  
Headley Bros., Inc., Chicago, Ill.  
Gray Ball Bearing Co., Ltd., Toronto.  
United States Mach. Tool Co., Cincinnati.  
Pratt & Whitney Co., Dundas, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING MACHINES, HORIZON- TAL AND VERTICAL

Becker Milling Machine Co., Boston, Mass.  
Bristol Machine Tool Co., Bristol, Conn.  
Brown & Sharpe Mfg. Co., Providence.  
Bertram & Sons Co., John, Dundas, Ont.  
Canada Machinery Corp., Galt, Ont.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Gooley & Edlund, Cortland, N.Y.  
Hardinge Bros., Inc., Chicago, Ill.  
Kearney & Trecker Co., Milwaukee, Wis.  
Niles-Bement-Pond Co., New York.  
Pratt & Whitney Co., Dundas, Ont.  
United States Mach. Tool Co., Cincinnati.  
Whitney Mfg. Co., Hartford, Conn.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING MACHINES, PLAIN, BENCH AND UNIVERSAL

Becker Milling Machine Co., Boston, Mass.  
Bilton Mach. Tool Co., Bridgeport, Conn.  
Brown & Sharpe Mfg. Co., Providence.  
Canada Machinery Corp., Galt, Ont.  
Cincinnati Milling Machine Co., Cincinnati.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Foss Machy. & Supply Co., G. F., Montreal.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Garvin Machine Co., New York.  
National Machy. Co., Tiffin, Ohio.  
Gooley & Edlund, Inc., Cortland, N.Y.  
Hardinge Bros., Inc., Chicago, Ill.  
Hendey Machine Co., Torrington, Conn.  
Kearney & Trecker Co., Milwaukee, Wis.  
Kemp-Smith Mfg. Co., Milwaukee, Wis.  
Niles-Bement-Pond Co., New York.  
Pratt & Whitney Co., Dundas, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING MACHINES, PROFILE

Brown & Sharpe Mfg. Co., Providence.  
Can. Fairbanks-Morse Co., Montreal.  
Foss Machy. & Supply Co., G. F., Montreal.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Garvin Machine Co., New York.  
Pratt & Whitney Co., Dundas, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

## MILLING TOOLS

Aikenhead Hardware Co., Toronto, Ont.  
Brown & Sharpe Mfg. Co., Providence.  
Ford-Smith Mach. Co., Hamilton, Ont.  
Geometric Tool Co., New Haven, Conn.  
Kemp-Smith Mfg. Co., Milwaukee, Wis.  
Rice Lewis & Son, Toronto, Ont.  
Tabor Mfg. Co., Philadelphia, Pa.  
Williams & Wilson, Ltd., Montreal, Que.

## MINE CARS

Can. Fairbanks-Morse Co., Montreal.  
Dominion Bridge Co., Montreal, Que.  
Elec. Steel & Metals, Welland, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.  
Modern Tool Co., Erie, Pa.  
Pratt & Whitney Co., Dundas, Ont.

## MINING MACHINERY

Can. Fairbanks-Morse Co., Montreal.  
Elec. Steel & Metals, Welland, Ont.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MIXERS, SAND

Frost Mfg. Co., Chicago, Ill.

## MORTISING MACHINES

Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Gray Ball Bearing Co., Ltd., Toronto.

## MOTORS, ELECTRIC

Can. Fairbanks-Morse Co., Montreal.  
Can. General Electric Co., Toronto.  
Garlock-Walker Machy. Co., Toronto, Ont.  
Lancashire Dynamo & Motor Co., Ltd., Toronto.  
MacGovern & Co., Montreal, Que.  
Volta Mfg. Co., Welland, Ont.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

## MOTOR SPRINGS

The Dunbar Brothers Co., Bristol, Conn.

## MOTORCYCLE FRAME AND FORK

The Dunbar Brothers Co., Bristol, Conn.

## MOTORS, PNEUMATIC

Cleveland Pneumatic Tool Co., Toronto.

## MULTIPLE INDEX CENTRES

Garvin Machine Co., New York.

## MULTI-DRILLING, MULTI-BORING, MULTI-TAPPING MACHINERY,

Nat. Automatic Tool Co., Richmond, Ind.

## MUNTZ METAL

Brown's Copper & Brass Roller Mills,  
New Toronto, Ont.

## MUSIC WIRE

Blancete Co., L. C., New York City.

## NAIL SETS

Morrow Screw & Nut Co., J., Ingersoll, Ont.

## NAME PLATES, BRONZE, ETCHED AND STAMPED

Matthews & Co., Jas. H., Pittsburgh, Pa.  
Pritchard-Andrews Co., Ottawa, Ont.  
Turner Brass Works, Sycamore, Ill.

## NICHROME CASTINGS

Can. Driver-Harris Co., Ltd., Walkerville.

## NICKEL

Baker & Co., Inc., H., Montreal, Que.  
Pilot Steel & Tool Co., Montreal, Que.

## NICKEL SILVER

Brown's Copper & Brass Rolling Mills,  
New Toronto, Ont.

## NICKEL STEEL

See Steel.

## NIPPLE HOLDERS

Curtis & Curtis Co., Bridgeport, Conn.

## NIPPLE THREADING MACHINES

Hall & Sons, Ltd., John H., Brantford.  
Landis Machine Co., Waynesboro, Pa.

## NITROGEN

Carter Welding Co., Toronto, Ont.

## NUTS, STEEL, CASTELLATED AND COLD PRESSED

Galt Machine Screw Co., Ltd., Galt, Ont.  
Morrow Screw & Nut Co., J., Ingersoll, Ont.  
Williams & Co., J. H., Brooklyn, N.Y.

## NUTS, SEMI-FINISH AND FINISHED

Galt Machine Screw Co., Galt, Ont.  
National-Acme Co., Cleveland, Ohio.  
Wilkinson & Kompass, Hamilton.

## NUT BURNING AND NUT MACHINES (HOT)

National Machy. Co., Tiffin, Ohio.

## NUT FACING AND BOLT SHAVING MACHINES

Garvin Machine Co., New York.  
National Machinery Co., Tiffin, Ohio.  
Victor Tool Co., Waynesboro, Pa.  
Williams & Wilson, Ltd., Montreal, Que.

## NUT TAPPERS

Bertram & Sons Co., John, Dundas, Ont.  
Canada Machinery Corp., Galt, Ont.  
Garvin Machine Co., New York.  
Hall & Son, J. H., Brantford, Ont.  
Jardine & Co., A. B., Hespeler.  
Landis Machine Co., Waynesboro, Pa.  
National Machinery Co., Tiffin, Ohio.  
Williams & Wilson, Ltd., Montreal, Que.

## OIL SEPARATORS

Can. Fairbanks-Morse Co., Montreal.

## OIL STONES

Aikenhead Hardware Co., Toronto, Ont.  
Carborundum Co., Niagara Falls, N.Y.  
Norton Co., Worcester, Mass.  
Rice Lewis & Son, Toronto, Ont.

## OIL STONE GRINDERS

Oliver Machy. Co., Grand Rapids, Mich.

## OIL STORAGE SYSTEMS

Pratt & Whitney Co., Ltd., S. F., Toronto, Ont.

## OPENING DIE HEADS

Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.

## OPTICAL SUPPLIES

Consolidated Optical Co., Toronto, Ont.

## OSCILLATING VALVE GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Canada,  
Toronto.

## Ovens FOR BAKING, BLUING, DRYING, ENAMELING, JAPAN- NING AND LACQUERING

Brantford Oven & Rack Co., Brantford.

## OVEN TRUCKS, STEEL

Brantford Oven & Rack Co., Brantford.

## Ovens FOR DRYING, TEMPER AND OXYGEN, ELECTROLYTIC CELLS UNDER TRUCKS

Welding & Supplies Co., Montreal, Que.  
Brantford Oven & Rack Co., Brantford.

## OXY-ACETYLENE WELDING AND CUTTING AND OUTFITS

Carter Welding Co., Toronto, Ont.  
Prest-Lift Co., Inc., Toronto, Ont.  
St. Lawrence Welding Co., Montreal, Que.  
Welding & Supplies Co., Montreal, Que.

## PACKINGS, ASBESTOS



# Heat Under Accurate Control

Here is an important factor in the heat treatment of metals. An intense heat, rapidly developed, and always under accurate control of the operator, are features that distinguish

## BELLEVUE FURNACES

These tool forges are particularly adapted for the requirements of the small machine shop for annealing and tempering dies, cutters, reamers, etc.

Combustion is perfect and no flames come in contact with material. Built to stand the highest temperature. Doors are properly counterbalanced. In every way BELLEVUE FURNACES meet with the demand for durability, efficiency and convenience.

Let us advise you about your heat-treating problems.

### Bellevue Industrial Furnace Company

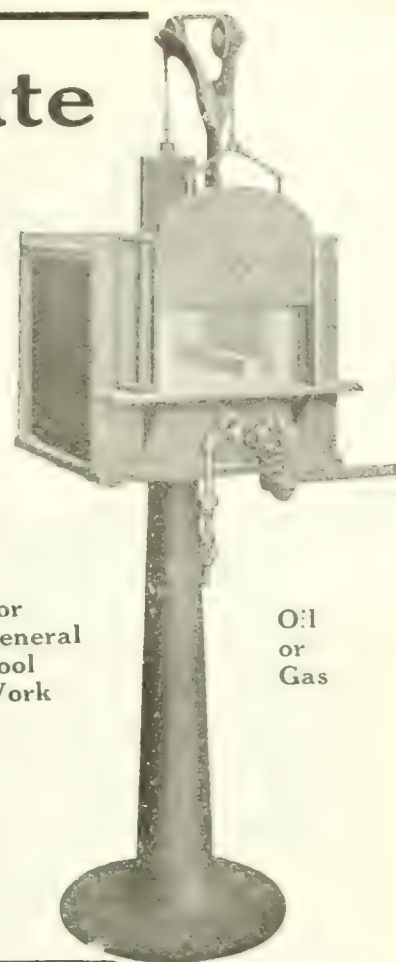
Julius C. Hinz, President

703 Bellevue Ave. - Detroit, Mich.

Representatives in Canada: H. W. PETRIE, LIMITED, Toronto, Canada

For  
General  
Tool  
Work

Oil  
or  
Gas



# The MacLean Business and Class Publications in Canada

TO SELL or buy from Canada such lines as machinery, hardware, food products, dry goods, books and stationery, paper, printing machinery and supplies and general merchandise of almost every description, raw or manufactured, use or consult the MacLean Business and Class Publications, as per list below. For special information, write the publishers. Concerning the quality of the MacLean publications let this copy of CANADIAN MACHINERY which you hold in your hands speak for all. The MacLean list of 15 publications is as follows:

THE CANADIAN GROCER (Est. 1886)  
HARDWARE AND METAL (Est. 1889)  
DRY GOODS REVIEW (Est. 1889)  
MEN'S WEAR REVIEW (Est. 1898)  
CANADIAN MACHINERY (1905)

THE POWER HOUSE (1907)  
BOOKSELLER AND STATIONER (Est. 1884)  
THE SANITARY ENGINEER (Est. 1907)  
MARINE ENGINEERING OF CAN. (1910)  
CANADIAN MOTOR, TRACTOR AND IMPLEMENT TRADE JOURNAL (Est. 1919)

CANADIAN FOUNDRYMAN (Est. 1909)  
PRINTER AND PUBLISHER (Est. 1892)  
THE FINANCIAL POST (Est. 1907)  
MACLEAN'S MAGAZINE (Est. 1896)  
FARMERS' MAGAZINE (Est. 1910)

This fact may interest you: namely, the MacLean organization is the largest concern of its kind in the British Empire. The output of its mechanical department every working day is the equivalent of a 150-page publication of the size and type of this copy of CANADIAN MACHINERY.

## Our London Office: 88 Fleet Street, E.C.

Also at: NEW YORK, BOSTON, CHICAGO, MONTREAL, WINNIPEG

For over 20 years the MacLean Publishing Company has maintained a fully-staffed London Office, and has rendered British and Continental manufacturers, shippers, and traders an invaluable service in many directions.

*Specimen copies of the MacLean Publications will be cheerfully forwarded to all asking for them.  
Address us at London or Toronto.*

## The MacLean Publishing Company, Limited

143-153 University Avenue - - - - - Toronto, Canada

*If interested tear out this page and place with letters to be answered*



Perrin, Ltd., William, Toronto.

**PANS, WET AND DRY**  
Frost Mfg. Co., Chicago, Ill.**PAPER MILL CONVEYORS AND DRIVES**Bertrams, Ltd., Edinburgh, Scotland.  
Can. Link-Belt Co., Toronto, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.**PARTITIONS, WIRE**  
See Guards**PAPER MILL MACHINERY**  
Garlock-Walker Machinery Co., Toronto.  
MacKinnon Steel Co., Sherbrooke, Que.**PATTERN SHOP EQUIPMENT**  
Canada Machinery Corp., Galt, Ont.  
Oliver Machy. Co., Grand Rapids, Mich.  
Garlock-Walker Machinery Co., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PATTERN MAKERS' LATHES**  
See Lathes.**PATENT SOLICITORS**Budden, Hanbury A., Montreal.  
Fetherstonhaugh & Co., Ottawa.  
Marion & Marion, Montreal.  
Ridout & Maybee, Toronto.  
Shogman & Co., H. C. Ottawa.  
Wilson & Co., J. C., Belleville, Ont.  
Greenleafs, Ltd., Belleville, Ont.  
Marten Machine Co., Hamilton, Ont.**PECK CARRIERS FOR POWER PLANTS**  
Can. Link-Belt Co., Toronto, Ont.**PENSTOCKS**

William Hamilton Co., Peterboro, Ont.

**PERFORATED METALS AND ORNAMENTAL IRON GOODS**  
Canada Wire & Iron Goods Co., Hamilton**PIG IRON**Hanna & Co., M. A., Cleveland, O.  
Steel Co. of Canada, Ltd., Hamilton, Ont.**PINS, TAPER**

Morrow Screw &amp; Nut Co., J., Ingersoll, Ont.

**PINS, BELT-LACING**  
Clipper Belt Lacer Co., Grand Rapids.**PIPE FITTINGS, MALLEABLE AND CAST IRON**International Malleable Iron Co., Guelph  
**PIPE CUTTING AND THREADING MACHINES**Can. Fairbanks-Morse Co., Montreal.  
Curtis & Curtis Co., Bridgeport, Conn.  
Garlock-Walker Machinery Co., Toronto.  
Garvin Machine Co., New York.  
Greenfield Tap & Die Corp., Greenfield.  
Hall & Sons, John H., Brantford.  
Jardine & Co., A. B., Hespeler, Ont.  
Lanvis Machine Co., Waynesboro, Pa.  
McDonough Co., R., Galt.  
Wells Bros. Co. of Canada, Galt, Ont.  
Williams Tool Co., Erie, Pa.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PHOTOSTATS**

Commercial Camera Co., Providence, R.I.

**PIPE RIVETED STEEL**Toronto Iron Works, Ltd., Toronto.  
William Hamilton Co., Peterboro, Ont.**PIERCING**

Oliver Machy. Co., Grand Rapids, Mich.

**PIPE CUTTERS, ROLLING**Curtis & Curtis Co., Bridgeport, Conn.  
Greenfield Tap & Die Corp., Greenfield.  
Hall & Sons, Ltd., John H., Brantford.  
Wells Bros. Co. of Canada, Galt, Ont.**PIPE TOOLS AND DIES**Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.**PIPE CUTTERS AND REAMERS**Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.**PIPE STOCKS AND THREADERS**  
Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.**PIPE TAPS AND VISES**Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.**PIPE WRENCHES**Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.**PISTON AND PISTON RING MACHINES**

National Acme Co., Windsor, Vt.

**PLANER BOLTS**

Morrow Screw &amp; Nut Co., J., Ingersoll, Ont.

**PLANER JACKS**

Armstrong Bros. Tool Co., Chicago.

**PLANERS, STANDARD AND ROTARY**Bettis Machine Co., Rochester, N.Y.  
Bertram & Sons Co., John, Dundas.  
Oliver Machy. Co., Grand Rapids, Mich.  
Canada Machinery Corp., Galt, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Frost Mfg. Co., Chicago, Ill.  
Garlock-Walker Machinery Co., Toronto.  
Greenleafs, Ltd., Belleville, Ont.  
Marten Machine Co., Hamilton, Ont.Morton Mfg. Co., Muskegon Heights, Mich.  
Niles-Bement-Pond Co., New York.  
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.  
Williams & Wilson, Ltd., Montreal, Que.**PLANING AND SHAPING MACHINERY**Canada Machinery Corp., Galt, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Frost Mfg. Co., Chicago, Ill.  
Garlock-Walker Machinery Co., Toronto.  
Garvin Machine Co., New York.  
Niles-Bement-Pond Co., New York.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PLANER-SHAPER, COMBINED****OPEN SIDE**Lynd-Farguhar Co., Boston.  
Williams & Wilson, Ltd., Montreal, Que.**POWER HAMMERS**

Quickwork Co., St. Marys, Ohio.

**PLANING MILL EXHAUSTERS**Can. Blower & Forge Co., Kitchener, Ont.  
MacGovern & Co., Montreal, Que.  
Niles-Bement-Pond Co., New York.**PLIERS**Aikenhead Hardware Co., Toronto.  
Can. Billings & Spencer, Ltd., Welland.  
Peck, Stow & Wilcox Co., Southington, Ct.  
Rice Lewis & Son, Toronto, Ont.  
Whitman & Barnes Co., St. Catharines.**PNEUMATIC TOOLS**Can. Ingersoll-Rand Co., Montreal, Que.  
Cleveland P'matic Tool Co., Can., Toronto.  
Curtis Pneumatic Machy. Co., St. Louis.  
Garlock-Walker Machy. Co., Toronto.  
Int. Mach. & Supply Co., Ltd., Montreal.  
Independent Pneumatic Tool Co., Chicago.**POWER CRANES, HAND**

MacKinnon Steel Co., Sherbrooke, Que.

**POLISHING MACHINES**Brown & Sharpe Mfg. Co., Providence, R.I.  
Ford-Smith Machine Co., Hamilton, Ont.  
Williams & Wilson, Ltd., Montreal, Que.**POTS AND KETTLES, CAST STEEL**  
Elec. Steel & Metals, Welland, Ont.**POLISHING PLATES**Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.**POWER HOUSE CONVEYORS**Can. Link-Belt Co., Toronto, Ont.  
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.**POWER TRANSMISSION MCHY.**  
Williams & Wilson, Ltd., Montreal, Que.**PRESSED STEEL PARTS**

Gray Ball Bearing Co., Ltd., Toronto.

**PRESSERS, ARBOR**Atlas Press Co., Kalamazoo, Mich.  
Metalwood Mfg. Co., Detroit, Mich.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, BROACHING, FORGING AND FLANGING**Atlas Press Co., Kalamazoo, Mich.  
Bliss Co., E. W., Brooklyn, N.Y.  
Metalwood Mfg. Co., Detroit, Mich.  
Toledo Machine & Tool Co., Toledo.  
Stoll Co., D. H., Buffalo, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, CAM, TOGGLE, EYELET**Baird Machine Co., Bridgeport, Conn.  
Bliss Co., E. W., Brooklyn, N.Y.  
Consolidated Press Co., Hastings, Mich.  
Toledo Machine & Tool Co., Toledo.  
Stoll Co., D. H., Buffalo, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, FILTER**Perrin, Ltd., William R., Toronto.  
Smalley-General Co., Inc., Bay City, Mich.**PRESSES, PNEUMATIC**Metalwood Mfg. Co., Detroit, Mich.  
Toledo Machine & Tool Co., Toledo.**PRESSES, DROP AND FORGING**Bliss Co., E. W., Brooklyn, N.Y.  
Brown, Boggs & Co., Ltd., Hamilton.  
Can. Fairbanks-Morse Co., Montreal.  
Niles-Bement-Pond Co., New York.  
Perrin, Ltd., William R., Toronto.  
Stoll Co., D. H., Buffalo, N.Y.  
Toledo Machine & Tool Co., Toledo.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, HYDRAULIC**Bertram & Sons Co., John, Dundas.  
Metalwood Mfg. Co., Detroit, Mich.  
Niles-Bement-Pond Co., New York.  
Perrin, Ltd., William R., Toronto.  
Toledo Machine & Tool Co., Toledo.  
Stoll Co., Inc., D. H., Buffalo, N.Y.  
West Tire Setter Co., Rochester, N.Y.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, BALING**

Perrin, Ltd., William R., Toronto.

**PRESSES, POWER**Baird Machine Co., Bridgeport, Conn.  
Bliss Co., E. W., Brooklyn, N.Y.  
Brown, Boggs & Co., Ltd., Hamilton.  
Canada Machinery Corp., Galt, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Consolidated Press Co., Hastings, Mich.  
Garlock-Walker Machinery Co., Toronto.Perrin, Ltd., William R., Toronto.  
Stoll Co., D. H., Buffalo, N.Y.  
Toledo Machine & Tool Co., Toledo.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, SPRING FOOT**Bliss Co., E. W., Brooklyn, N.Y.  
Brown, Boggs & Co., Hamilton, Ont.  
Consolidated Press Co., Hastings, Mich.  
Toledo Machine & Tool Co., Toledo.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, SCREW**Barnes & Co., W. F. & Jno., Rockford, Ill.  
Bliss Co., E. W., Brooklyn, N.Y.  
Perrin, Ltd., William R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PRESSES, TRIMMING**Bliss Co., E. W., Brooklyn, N.Y.  
Canada Machinery Corp., Galt, Ont.  
Consolidated Press Co., Hastings, Mich.  
Stoll Co., D. H., Buffalo, N.Y.  
Williams & Wilson, Ltd., Montreal, Que.**PROPELLERS**

Kennedy &amp; Sons, Wm., Owen Sound.

**PROTECTIVE COATINGS**

H. H. Robertson, Ltd., Samia, Ont.

**PSYCOMETERS, SLING**

Taylor Instrument Co., Rochester, N.Y.

**PULLEYS**Algoma Steel Corp., Sault Ste. Marie, Ont.  
American Pulley Co., Philadelphia, Pa.  
Baird Machine Co., Bridgeport, Conn.  
Bernard Industrial Co., Fortierville, Que.  
Brown & Sharpe Mfg. Co., Providence.  
Can. Fairbanks-Morse Co., Montreal.  
Ford-Smith Machine Co., Hamilton, Ont.  
Kennedy & Sons, Ltd., W. Owen Sound.  
Positive Clutch & Pulley Works Ltd., Toronto.  
Wilson & Co., J. C., Belleville, Ont.  
Williams Machy. Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PULLEYS, STEEL SASH, STEEL BELT**

American Pulley Co., Philadelphia, Pa.

**PULLEYS, FRICTION, CLUTCH**American Pulley Co., Philadelphia, Pa.  
Baird Machine Co., Bridgeport, Conn.  
Bernard Industrial Co., Fortierville, Q.  
Can. Link-Belt Co., Toronto, Ont.  
Carlyle Johnson Mch. Co., Manchester, Ct.  
Positive Clutch & Pulley Works, Toronto.  
Jones & Glasco, Montreal.  
Williams & Wilson, Ltd., Montreal, Que.**PULP MILL MACHINERY**

MacKinnon Steel Co., Sherbrooke, Que.

**PUMPS, CENTRIFUGAL**Brown & Sharpe Mfg. Co., Providence, R.I.  
Can. Blower & Forge Co., Kitchener, Ont.  
Can. Ingersoll-Rand Co., Montreal, Que.  
Darling Bros., Ltd., Montreal, Que.  
Urat & Whitney Co., Douglas, Ont.  
Williams & Wilson, Ltd., Montreal, Que.**PUMPS, FUEL OIL**Brown & Sharpe Mfg. Co., Providence, R.I.  
Darling Bros., Ltd., Montreal, Que.  
Trahern Pump Co., Rockford, Ill.**PUMPS, GEARED**

Darling Bros., Ltd., Montreal, Que.

**PUMPS, HIGH PRESSURE**

Perrin, Ltd., William R., Toronto.

**PUMPS, HYDRAULIC**Garlock-Walker Machinery Co., Toronto.  
Darling Bros., Ltd., Montreal, Que.  
Elec. Steel & Metals, Welland, Ont.  
Metalwood Mfg. Co., Detroit, Mich.  
Perrin, Ltd., William R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.**PUMPS, LUBRICATING, OIL STORAGE**

Brown &amp; Sharpe Mfg. Co., Providence, R.I.

**PUMPS, SPECIAL**

Elec. Steel &amp; Metals, Welland, Ont.

**PUMPS, RUBBER CEMENT**

Brown &amp; Sharpe Mfg. Co., Providence, R.I.

**PUMPS, KEROSENE, OIL, SELF-MEASURING**Brown & Sharpe Mfg. Co., Providence, R.I.  
Fry's (London), Ltd., London, England.  
Trahern Pump Co., Rockford, Ill.**PUMPS, LUBRICANT, OIL, WATER**

Fry's (London), Ltd., London, England.

**PUMPS, SUD**

Fry's (London), Ltd., London, England.

**PUMP LEATHERS**

Graton &amp; Knight Mfg. Co., Worcester.

**PUNCHES AND DIES**Atkins & Co., Ltd., Wm., Sheffield, Eng.  
E. W. Bliss Co., Brooklyn, N.Y.  
Baker & Co., Inc., H. Montreal, Que.  
Brown, Boggs & Co., Ltd., Hamilton, Can.  
Can. Blower & Forge Co., Kitchener, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Gardner & Son, Robert, Montreal.  
A. B. Jardine & Co., Hespeler, Ont.  
Marshall, Son & Bunney, Toronto.  
Marten Machine Co., Hamilton, Ont.  
Peck, Stow & Wilcox Co., Southington, Ct.  
Pilot Steel & Tool Co., Montreal, Que.Pratt & Whitney Co., Dundas, Ont.  
Stoll Co., D. H., Buffalo, N.Y.  
Toledo Machine & Tool Co., Toledo, O.  
Whitman & Barnes Co., St. Catharines.  
Williams & Wilson, Ltd., Montreal, Que.**PUNCHES, HAND**

Peck, Stow &amp; Wilcox Co., Southington, Ct.

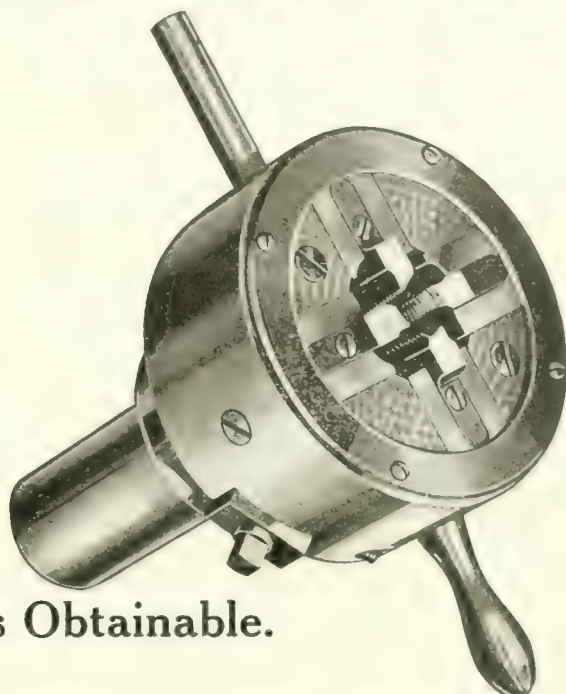
**PUNCHES, POWER**John Bertram & Sons Co., Dundas, Ont.  
E. W. Bliss Co., Brooklyn, N.Y.  
Brown, Boggs & Co., Ltd., Hamilton, Ont.  
Canada Machinery Corp., Galt, Ont.  
Consolidated Press Co., Hastings, Mich.  
Garlock-Walker Machinery Co., Toronto.  
A. B. Jardine & Co., Hespeler, Ont.  
Long & Alstatter, Hamilton, Ohio.  
Niles-Bement-Pond Co., New York.  
D. H. Stoll Co., Buffalo, N.Y.  
Wickes Bros., Saginaw, Mich.  
Williams & Wilson, Ltd., Montreal, Que.**PUNCHING MACHINES, HORIZONTAL**Bertrams, Ltd., Edinburgh, Scotland.  
Bertrams & Sons, John, Dundas, Ont.  
Canada Machinery Corp., Galt, Ont.  
E. W. Bliss Co., Brooklyn, N.Y.  
Brown, Boggs & Co., Ltd., Hamilton, Ont.  
Garlock-Walker Machy. Co., Toronto.  
Niles-Bement-Pond Co., New York.  
Wickes Bros., Saginaw, Mich.  
Williams & Wilson, Ltd., Montreal, Que.**PYROMETERS**Bristol Co., Waterbury, Conn.  
Shore Instrument & Mfg. Co., New York.  
Taylor Instrument Co., Rochester, N.Y.**QUARTERING MACHINES**Bertram & Sons, John, Dundas, Ont.  
Niles-Bement-Pond Co., New York.**RAIL BENDERS**Algoma Steel Corp., Sault Ste. Marie, O.  
Niles-Bement-Pond Co., New York.**RAILROAD TOOLS**Can. Fairbanks-Morse Co., Montreal.  
Garlock-Walker Machinery Co., Toronto.  
Niles-Bement-Pond Co., New York.  
Williams & Wilson, Ltd., Montreal, Que.**RASPS**Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Marshall, Son & Bunney, Toronto.  
John Morrow Screw & Nut Co., Ingersoll.**RATCHETS**Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Keystone Mfg. Co., Buffalo, N.Y.  
Marshall, Son & Bunney, Toronto.**SAWBLADE PINIONS (See Gears) REAMERS**Blanco Co., L. C., New York City.  
Butterfield & Co., Inc., Rock Island, Que.**REAMERS, ADJUSTABLE**Blanco Co., L. C., New York City.  
Can. Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Greenfield Tap & Die Corp., Greenfield.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Pewees, Ltd., Winnipeg, Man.  
Pratt & Whitney Co., Dundas, Ont.  
The Kelly Reamer Co., Cleveland, O.  
J. A. M. Taylor, 318 Stair Bldg., Toronto.  
Wells Bros. of Can., Galt, Ont.  
Whitman & Barnes Co., St. Catharines.**REAMERS, BRIDGE, EXPANDING AND HIGH SPEED**Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Aikenhead Hardware Co., Toronto.  
Blanco Co., L. C., New York City.  
V. Boker & Co., Inc., Montreal, Que.  
Autterfield & Co., Rock Island, Que.  
Can. Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Gisholt Machine Co., Madison, Wis.  
Illinois Tool Works, Chicago, Ill.  
Marshall, Son & Bunney, Toronto.  
Morrow Screw & Nut Co., J., Ingersoll, Ont.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Pilot Steel & Tool Co., Montreal, Que.  
Pratt & Whitney Co., Dundas, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.**REAMERS STEEL TAPER AND SELF-FEEDING**Butterfield & Co., Rock Island, Que.  
Blanco Co., L. C., New York City.  
Can. Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Illinois Tool Works, Chicago, Ill.  
A. B. Jardine & Co., Hespeler, Ont.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Pratt & Whitney Co., Dundas, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.**REAMERS, CHUCKING**Atkins & Co., Ltd., Wm., Sheffield, Eng.  
Blanco Co., L. C., New York City.  
Greenfield Tap & Die Corp., Greenfield.  
Marshall, Son & Bunney, Toronto.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.  
Wells Bros. of Canada, Galt, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.**REAMERS, HAND**Blanco Co., L. C., New York City.  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.  
Wells Bros. of Can., Galt, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.



# MODERN

## Self-Opening

## Die Heads



**The Most Accurate, the Most Dependable, the Most Durable Self-Opening Die Heads Obtainable.**

**Because** of other superior qualities Modern Self-Opening Die Heads have been adopted as Standard Equipment on about 90% of the highest grade turret machines made in America. This is significant because much of the Reputation of any machine depends upon the character and satisfactory operation of the equipment supplied.

**Moderns** are for use on turret of any hand or automatic screw machine, and when fitted with closing device on lathes, drill presses and other revolving spindle machines.

**Moderns** offer many advantages over any other die heads obtainable. They're simple in design—have few parts. They do not clog easily. May be quickly and easily cleaned **WITHOUT DISMOUNTING**, and without taking entirely apart.

**Every Modern Self-Opening Die Head** has a wide range of diameters which may be cut, thus avoiding the necessity of purchasing a separate head for different jobs.

**Modern's** chief claim to favor is **UNEQUALED ACCURACY**. Chasers cannot change position during work. When set they are as rigid as solid heads. Chasers will not "rock," "cock" or "bell at the mouth."

**Let us tell you more about these wonderful aids to accuracy and big production in threading operations. Send for bulletins.**

## MODERN TOOL CO.

MAIN OFFICE  
AND WORKS

ERIE, PA.

FOURTH AND  
FRENCH STS.

BRANCH OFFICES

New York, N.Y., 2 Rector St.  
Chicago, Ill., 42 N. Clinton St.  
Detroit, Mich., 40 Larned St., East.

Cleveland, Ohio, Guardian Bldg.  
Cincinnati, Ohio, 2 Greenwood Office Bldg.  
Export Dept., 2 Rector St., N.Y. City.

Canadian Agents: Rudel-Belnap Machinery Co., Ltd., Toronto and Montreal.  
California Representatives: Herberts Machinery & Supply Co., Los Angeles and San Francisco.

### OTHER

### MODERN TOOLS

- Plain Grinders
- Universal Grinders
- Internal Grinders
- Chaser Grinders
- "Magic" Chucks
- Tapping Attachments
- Collapsible Taps



**REAMERS, PIN**  
Blanche Co., L. C., New York City.  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield.  
Morrow Screw & Nut Co., John, Ingersoll.  
Wells Bros. of Can., Galt, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.

**REAMER FLUTING MACHINES**  
Garvin Machine Co., New York.

**REAMING MACHINES, PNEUMATIC**  
Cleveland Pneumatic Co. of Can., Toronto.  
Garlock-Walker Machinery Co., Toronto.

**RECORDING INSTRUMENTS**  
Bristol Co., Waterbury, Conn.  
Gisholt Machine Co., Madison, Wis.  
Taylor Instrument Co., Rochester, N.Y.

**REELS, WIRE AND TEXTILE MFG.**  
American Pulley Co., Philadelphia, Pa.

**REGULATORS, AUTOMATIC**  
Electric Steels & Metals, Ltd., Welland.

**REGULATORS, PRESSURE, TEMPERATURE**  
Can. Fairbanks-Morse Co., Montreal.  
Taylor Instrument Co., Rochester, N.Y.

**REPAIR WORK, ALL KINDS**  
Elec. Steel & Metals, Welland, Ont.

**RESPIRATORS**  
Strong, Kennard & Nutt Co., Cleveland.

**RIVETS.**  
Aikenhead Hardware Co., Toronto, Ont.  
Parmenter & Bulloch Co., Gananoque.  
Rice, Lewis & Son, Toronto.  
Steel Co. of Canada, Ltd., Hamilton.

**RIVETERS, PNEUMATIC, HYDRAULIC, HAMMER, COMPRESSION**  
Can. Fairbanks-Morse Co., Montreal.  
Can. Ingersoll-Rand Co., Montreal.  
Cleveland Pneumatic Tool Co. of Canada, Toronto.  
Garlock-Walker Machinery Co., Toronto.  
Independent Pneumatic Tool Co., Chicago.  
Niles-Bement-Pond Co., New York.

**RIVETING MACHINES, ELASTIC, ROTARY BLOW**  
Grant Mfg. & Machine Co., Bridgeport.  
High-Speed Hammer Co., Rochester.  
Williams & Wilson, Ltd., Montreal.  
F. B. Shuster Co., New Haven, Conn.

**ROAD BUILDING EQUIPMENT**  
Can. Ingersoll-Rand Co., Ltd., Sherbrooke.

**RODS, HIGH SPEED AND CARBON DRILL**  
Blanche Co., L. C., New York City.

**RODS, ROPE AND SPRING**  
Page Steel & Wire Co., Adrian, Mich.

**RODS, PURE NICKEL, MONEL**

**METAL, NICHROME**  
Can. Driver-Harris Co., Ltd., Walkerville.

**ROLLER CHAINS**  
Can. Link-Belt Co., Toronto.  
Jones & Glasco, Montreal.

**ROLLS, BENDING, STRAIGHTENING**  
John Bertram & Sons Co., Dundas.  
Brown, Boggs Co., Ltd., Hamilton.  
Can. Machinery Corp., Galt, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Niles-Bement-Pond Co., Toledo, O.  
Toledo Machine & Tool Co., Toledo, O.  
Williams & Wilson, Ltd., Montreal, Que.

**ROLLS AND TABLES**  
Elec. Steel & Metals, Welland, Ont.

**ROOFING**  
H. H. Robertson, Ltd., Sarnia, Ont.

**ROPE, GALV., MONEL METAL, BRONZE, TILER AND SASH CORD**

Can. Driver-Harris Co., Ltd., Walkerville

**ROTARY SHEARS**  
The Quickwork Co., St. Mary's, Ohio.

**ROOF COOLERS**  
Electric Steels & Metals, Ltd., Welland.

**ROLLS, CRUSHING**  
Can. Link-Belt Co., Toronto.

**RUBBER MILL DRIVES**  
Can. Link-Belt Co., Toronto.

**RUBBER MILL MACHINERY**  
Bertrams Ltd., Edinburgh, Scotland.

**RULES**  
Brown & Sharpe Mfg. Co., Providence.  
James Chesterman & Co., Ltd., Sheffield.  
Rice, Lewis & Son, Toronto.  
L. S. Starrett Co., Athol, Mass.

**RULES, STEEL, STRAIGHT, AND FOLDING**  
Lufkin Rule Co. of Can., Windsor.

**RULES, BOXWOOD, FOLDING**  
Lufkin Rule Co. of Can., Windsor.

**RULES, BOARD AND LONG**  
Lufkin Rule Co. of Can., Windsor.

**SAW MILL CONVEYORS**  
Can. Link-Belt Co., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

**SAFETY DEVICES**  
Strong, Kennard & Nutt Co., Cleveland.

**SAND MILLS**  
Frost Mfg. Co., Chicago, Ill.

**SAND-BLAST EQUIPMENT**  
**SAND BLAST SUPPLIES AND ACCESSORIES**

Pangborn Corporation, Hagerstown, Md.

**SAFETY APPLIANCES**  
Strong, Kennard & Nutt Co., Cleveland.

**SAFETY APPLIANCE GOGGLES**  
T. A. Willson Co., Inc., Reading, Pa.

**SAND BLAST ABRASIVES**  
Pangborn Corporation, Hagerstown, Md.  
Pittsburgh Crushed Steel Co., Pittsburgh

**SAND MIXING MACHINERY**  
Frost Mfg. Co., Chicago, Ill.

**SANITARY DRINKING FOUNTAINS**  
Pure Sanitary Drinking Fountain Co., Havensville.

**SANDERS, DISC AND SPINDLE**  
Can. Sander Mfg. Co., Brockville, Ont.

**SANDING MACHINES**  
Canada Machinery Corp., Galt.  
Can. Sander Mfg. Co., Brockville, Ont.

**SAW MILL MACHINERY**  
Can. Fairbanks-Morse Co., Montreal.  
Canada Machinery Corp., Galt.  
Robert Gardner & Son, Montreal.  
Curtis Pneumatic Mach. Co., St. Louis.  
A. R. Williams Machy. Co., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

**SASH SPRINGS**  
The Dunbar Brothers Co., Bristol, Conn.

**SAWS, CIRCULAR METAL**  
Wm. Atkins & Co., Ltd., Sheffield, Eng.  
Hunter Saw & Machine Co., Pittsburgh.  
Marshall, Son & Bunney, Toronto.  
Plews Ltd., Winnipeg, Man.  
Simonds Mfg. Co., Pittsburgh, Mass.  
Tabor Mfg. Co., Philadelphia, Pa.

**SAWS, HACK (See Hack Saws)**

**SAW SHARPENERS**  
Greenfield Tap & Die Corp., Greenfield.  
Hunter Saw & Machine Co., Pittsburgh.  
Wells Bros. of Can., Galt, Ont.

**SAWS, SLITTING**  
J. A. M. Taylor, Stair Bldg., Toronto.

**SCALES, MECHANICS'**  
Lufkin Rule Co. of Can., Windsor.

**SCLEROSCOPES**  
Shore Instrument & Mfg. Co., New York.

**SCREENING MACHINERY**  
Can. Link-Belt Co., Toronto.

**SCREW DRIVERS**  
Wassman & Barnes Co., St. Catharines.

**SCREW EXTRACTORS**  
Cleveland Twist Drill Co., Cleveland.

**SCREW MACHINES, HAND, AUTOMATIC**  
Brown & Sharpe Mfg. Co., Providence.  
Can. Fairbanks-Morse Co., Montreal.  
Foster Machine Co., Elkhart, Ind.  
Garlock-Walker Machy. Co., Ltd., Toronto.  
Greenfield Tap & Die Corp., Greenfield.  
A. B. Jardine & Co., Hespeler.  
National Acme Co., Cleveland, Ohio.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Can., Galt, Ont.  
Warner & Swasey Co., Cleveland, O.  
A. R. Williams Machy. Co., Toronto.  
Wood Turret Mach. Co., Brazil, Ind.  
Williams & Wilson, Ltd., Montreal, Que.

**SCREWS, MACHINE, SET, CAP AND SPECIAL**  
Galt Machine Screw Co., Galt.  
John Morrow Screw & Nut Co., Ingersoll.  
National Acme Co., Montreal.  
Rice, Lewis & Son, Toronto.  
Steel Co. of Canada, Ltd., Hamilton.  
Wilkinson & Kompass, Hamilton.

**SCREW COLLARS**  
Galt Machine Screw Co., Ltd., Galt, Ont.  
John Morrow Screw & Nut Co., Ingersoll.

**SCREW MACHINES, PLAIN WIRE FEED**  
Brown & Sharpe Mfg. Co., Providence, R.I.

**SCREW PLATES**  
Butterfield & Co., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield.  
A. B. Jardine & Co., Hespeler.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.  
Rice, Lewis & Son, Toronto.  
J. A. M. Taylor, Stair Bldg., Toronto.  
Wells Bros. of Can., Galt.  
Wilkinson & Kompass, Hamilton.

**SCREWS, SAFETY SET**  
Galt Machine Screw Co., Ltd., Galt, Ont.

**SCREW SLOTTERS**  
Butterfield & Co., Rock Island, Que.  
Garvin Machine Co., New York.  
National Acme Co., Cleveland, O.  
Pratt & Whitney Co., Dundas, Ont.

**SEPARATORS, MOISTENERS AND OIL FOR COMPRESSED AIR**  
Pangborn Corporation, Hagerstown, Md.

**SELF-OPENING DIES**  
See Dies.

**SEPARATORS, SAND**  
Pangborn Corporation, Hagerstown, Md.

**SET SCREWS, SAFETY**  
Aikenhead Hardware Co., Toronto.  
Bristol Co., Waterbury, Conn.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.  
Wilkinson & Kompass, Hamilton.

**SHANKS, STRAIGHT AND TAPER**  
Jacobs Mfg. Co., Hartford, Conn.

**SHAPERS**  
John Bertram & Sons Co., Dundas.  
Can. Fairbanks-Morse Co., Montreal.  
Canadian Machinery Corp., Galt.  
Geo. F. Foss Mch. & Sply. Co., Montreal.  
Robert Gardner & Son, Montreal.  
Garlock-Walker Machy. Co., Toronto.  
Hendey Machine Co., Torrington, Conn.  
Hamilton Mach. Tool Co., Hamilton.  
Milwaukee Shaper Co., Milwaukee, Wis.  
R. B. Wilson, Ltd., Montreal.

**SHAPERS, GEAR**  
Fellows Gear & Shaper Co., Springfield, V.

**SHAFTING**  
Algoma Steel Corp., Sault Ste. Marie, O.  
Can. Fairbanks-Morse Co., Montreal.  
Garlock-Walker Machy. Co., Ltd., Toronto.  
Jones & Glasco, Montreal.  
Niles-Bement-Pond Co., New York.  
Can. Drawn Steel Co., Hamilton.  
Galt & Whitney Co., Dundas.  
Rice, Lewis & Son, Toronto.  
A. R. Williams Machy. Co., Toronto.  
Wilkinson & Kompass, Hamilton, Ont.  
Wilson & Co., J. C., Belleville, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**SHARPENING STONES**  
Norton Co., Worcester, Mass.  
Rice, Lewis & Son, Toronto.

**SHEARING MACHINES, ANGLE IRON, BAR AND GATE**  
John Bertram & Sons Co., Dundas.  
Bertrams Ltd., Edinburgh, Scotland.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machy. Co., Ltd., Toronto.  
A. B. Jardine & Co., Hespeler, Ont.  
Niles-Bement-Pond Co., New York.  
Toledo Machine & Tool Co., Toledo, O.

**SHEARS, POWER**  
John Bertram & Sons Co., Dundas.  
E. W. Bliss Co., Brooklyn, N.Y.  
Brown, Boggs Co., Ltd., Hamilton.  
Can. Blower & Forge Co., Kitchener.  
Canada Machinery Corp., Galt, Ont.  
Garlock-Walker Machy. Co., Ltd., Toronto.  
Long & Allistair, Hamilton, Ohio.  
Wicks Bros., Saginaw, Mich.  
A. B. Jardine & Co., Hespeler, Ont.  
National Machy. Co., Tiffin, Ohio.  
Niles-Bement-Pond Co., New York.  
H. D. Stoll Co., Inc., Buffalo, N.Y.  
Toledo Machine & Tool Co., Toledo, O.  
Williams & Wilson Ltd., Montreal, Que.

**SHEARS, ROTARY**  
The Quickwork Co., St. Mary's, Ohio.

**SHEARS, PNEUMATIC**  
Toledo Machine & Tool Co., Toledo, Ohio.

**SHEET METAL ROLLING MACHINES**  
Peck, Stow & Wilcox Co., Southington.

**SHEETS, NICKEL, RESIST, ALLOY**  
Can. Driver-Harris Co., Ltd., Walkerville.

**SHEARS, PLATE CUTTING, SLITTING**  
Quickwork Co., St. Mary's, Ohio.

**SHEARS, SPLITTING**  
Peck, Stow & Wilcox Co., Southington.

**SHEARS, IRREGULAR AND CIRCLE CUTTING**  
The Quickwork Co., St. Mary's, Ohio.  
D. H. Stoll Co., Inc., Buffalo, N.Y.

**SHEET METAL MACHINERY**  
Peck, Stow & Wilcox Co., Southington, O.

**SHEARS, SERPENTINE**  
The Quickwork Co., St. Mary's, Ohio.

**SHEARS, SQUARING**  
Brown, Boggs & Co., Hamilton, Ont.  
D. H. Stoll Co., Inc., Buffalo, N.Y.

**SHEET METAL WORKING TOOLS**  
Baird Machine Co., Bridgeport, Conn.  
E. W. Bliss Co., Brooklyn, N.Y.  
Brown, Boggs & Co., Hamilton.  
Peck, Stow & Wilcox Co., Southington O.  
D. H. Stoll Co., Inc., Buffalo, N.Y.  
Williams & Wilson, Ltd., Montreal.

**SHEETS, CRUCIBLE, CAST**  
Kaiser-Edison & Co., Ltd., Montreal.  
Ralph B. Norton, Agent, Montreal.

**SHEET METAL WORKING MACHINERY**  
D. H. Stoll Co., Inc., Buffalo, N.Y.

**SHELVING, STEEL**  
Dennis Wire & Iron Works, London.

**SHIPYARD MACHINERY, SHOP FURNITURE**  
Dennis Wire & Iron Works, London.

**SIDE TOOLS**  
Armstrong Bros. Tool Co., Chicago.

J. H. Williams & Co., Brooklyn, N.Y.

**SILENT CHAINS**  
Can. Link-Belt Co., Toronto, Ont.  
Jones & Glasco, Montreal.

**SLEDGES**  
Aikenhead Hardware Co., Toronto, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Whitman & Barnes Mfg. Co., St. Catharines, Ont.  
Wilkinson & Kompass, Hamilton, Ont.

**SLEDGES, CAST IRON**  
Katie Foundry, Galt, Ont.

**SLINGS, CHAINS**  
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

**SLOTTERS**  
Betts Machine Co., Rochester, N.Y.  
Garvin Machine Co., New York.  
National Acme Co., Cleveland, Ohio.  
Niles-Bement Pond Co., New York.

**SMOKESTACKS**  
William Hamilton Co., Peterboro, Ont.  
MacKinnon Steel Co., Sherbrooke, Que.

**SNIPS, TINNERS AND SHEET METAL WORKERS**  
Kearney & Trecker Co., Milwaukee, Wis.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.

**SOCKETS**  
Brown & Sharpe Mfg. Co., Providence.  
Butterfield & Co., Inc., Rock Island, Que.  
Cleveland Twist Drill Co., Cleveland.  
Keystone Mfg. Co., Buffalo, N.Y.  
Modern Tool & Die Co., Erie, Pa.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Rice Lewis & Son, Toronto, Ont.  
Whitman & Barnes Mfg. Co., Akron, O.

**SOIL PIPE FITTINGS, CAST IRON**  
Katie Foundry, Galt, Ont.

**SOLDERING IRONS**  
Aikenhead Hardware Co., Toronto, Ont.  
Brown, Boggs & Co., Hamilton, Ont.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Rice Lewis & Son, Toronto, Ont.

**SOLDER**  
Aikenhead Hardware Co., Toronto, Ont.  
Canada Metal Co., Ltd., Toronto, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Tallman Brass & Metal Co., Hamilton.

**SPEED REDUCING GEARS**  
Can. Link-Belt Co., Toronto, Ont.  
Jones & Glasco, Montreal.

**SLICING CLAMPS**  
Peck, Stow & Wilcox Co., Southington, Conn.

**SPRINGS, MACHINERY**  
Barnes Wallace Co., Bristol, Conn.  
Can. Steel Foundries, Ltd., Montreal.  
Cleveland Wire Spring Co., Cleveland.  
Dunbar Bros. Co., Bristol, Conn.  
Garlock-Walker Machinery Co., Toronto.  
Jas. Steele, Ltd., Guelph, Ont.

**SPECIAL MACHINERY**  
Baird Machine Co., Bridgeport, Conn.  
Bertram John & Sons Co., Dundas.  
Bliss E. W. Co., Brooklyn, N.Y.  
Brown, Boggs & Co., Hamilton, Canada.  
Brown Engineering Corp., Toronto, Ont.  
Ford-Smith Machine Co., Hamilton, Ont.  
Garlock-Walker Machinery Co., Toronto.  
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.  
Garvin Machine Co., New York.  
Gooley & Edmund, Inc., Courland, N.Y.  
John H. Hall & Sons, Bradford.  
A. B. Jardine & Co., Hespeler, Ont.  
Katie Foundry, Galt, Ont.  
National Acme Co., Cleveland, Ohio.  
Garvin Machine Co., Hamilton, Ont.  
Rae Brothers, Hamilton, Ont.  
Stoll Co. D. H., Buffalo, N.Y.  
Victoria Foundry Co., Ottawa, Ont.  
Wilson & Co., J. C., Belleville, Ont.  
William R. Perrin, Ltd., Toronto.

**SPRING COILING AND WINDING MACHINERY**  
Baird Machine Co., Bridgeport, Conn.  
Garvin Machine Co., New York.

**SPRING MAKING MACHINERY (AUTOMATIC)**  
Baird Machine Co., Bridgeport, Conn.

**SPRINGS, SPIRAL, TOOL**  
The Dunbar Bros. Co., Bristol, Conn.

**SPROCKETS, COMPENSATING**  
Morse Chain Co., Ithaca, New York

**SPROCKETS, SPRING**  
Morse Chain Co., Ithaca, New York

**SPROCKETS, CHAIN**  
Can. Link-Belt Co., Toronto, Ont.  
Grant Gear Works, Boston, Mass.  
Jones & Glasco, Montreal.  
Morse Chain Co., Ithaca, N.Y.  
Philadelphia Gear Works, Philadelphia.  
Wilson & Co., J. C., Belleville, Ont.

**SPRINGS FOR TOYS AND ELECTRIC DEVICES**  
The Dunbar Bros. Co., Bristol, Conn.

**SPROCKET WHEELS, CAST**  
Can. Link-Belt Co., Toronto, Ont.



# Is the Alien a Menace?

**I**N the October issue of MACLEAN'S MAGAZINE a strong presentation is made of the reason why the people of the West are against further foreign immigration.

"The Menace of the Alien" depicts the foreign problem in the Canadian West as it exists to-day, and shows every one of us why we must Canadianize our Ruthenians, Austrians, Slovaks, and our fifty-seven other varieties before we allow any further "unrestricted" immigration.

This article is written by a member of MACLEAN'S MAGAZINE staff who has just returned from a careful, personal investigation of the situation. Shall we have a "White West?" Many Westerners are demanding it. Are the aliens to swing labor into the bosom of the O.B.U.? It is being done—and what must we do to stop it?

The "inside" story of the routing of the Drumheller miner aliens by returned Canadian war veterans is here held by MACLEAN'S for the first time. What leadership must be substituted for the O.B.U. leadership of these foreigners?

*The October issue of MACLEAN'S is a Western number in the sense that it contains many articles and stories of distinctly Western interest. For instance:*

## X "Those Pesky Farmers Out West"

*By Hopkins Moorhouse, author of "Deep Furrows"*

They have completely upset the old order of things. No longer will politics consist of the comfortable fight between the Ins and Outs with the old party lines maintained. The grain growers on the Prairies have upset the calculations of the professional politicians and completely changed the face of Dominion politics.

## X "Fifty Years in the West"

*By Professor W. T. Allison*

A breezy and readable sketch of the business career of Winnipeg's veteran business man, James H. Ashdown.

## "Further Discoveries of New Lands"

*By Vilhjalmur Stefansson*

The final and most interesting instalment of Mr. Stefansson's story of his wonderful trip of five years' duration in the Canadian north in which he tells for the first time of finding new continents in the Arctic and hoisting there the Canadian flag.

## X "The Banshee Bell"

*By Edith G. Bayne*

A bright love story laid in the mountains of British Columbia.

## Other Splendid Features of October MacLean's

## X "The Turmoil at Ottawa"

*By J. K. Munro*

A comprehensive survey of Dominion politics, written with complete impartiality and absolute candor. It is bright and breezy, with a knock in every line for the political opportunists. It plucks many tail feathers from our party leaders.

## "Spanish Doubloons"

*By Camilla Kenyon*

The start of a bright and fascinating serial story by a brilliant young writer. It is the Spanish Main brought up-to-date, treasure hunting with a background of fun and romance.

## "The Airy Prince"

*By Arthur Beerley Baxter*

A complete novelette in which is presented a bird's-eye view of England in time of war. It is one of the most brilliant stories that has been written of recent years.

## "His Majesty's Well-Beloved"

*By Baroness Orczy*

The latest novel by this popular authoress appearing exclusively in MACLEAN'S.

## "Ebb and Flow"

*By C. W. Stephens*

A strong business story laid in the province of Quebec.

Over 70,000 Canadian Families Buy

# MACLEAN'S

"CANADA'S NATIONAL MAGAZINE"

**OCTOBER ISSUE** Now On Sale At All News Dealers **20c**

If there are no newsdealers in your town, or if your newsdealers cannot supply you, send 20 cents for a sample copy or \$2.00 for a whole year's subscription to MACLEAN'S MAGAZINE, 143-153 University Avenue, Toronto, Canada.



Perrin, Wm. R., Toronto  
Wilson & Co., J. C., Belleville, Ont.

**SPROCKET WHEELS, CHILLED  
THREAD**  
Katie Foundry, Galt, Ont.

**SQUARES**  
Peck, Stow & Wilcox Co., Southington,  
Conn.

**SAFETY CYLINDERS**  
Oliver Mach. Co., Grand Rapids, Mich.

**SANDERS**  
Oliver Mach. Co., Grand Rapids, Mich.

**SAW BENCHES**  
Oliver Mach. Co., Grand Rapids, Mich.

**SAW GUARDS**  
Oliver Mach. Co., Grand Rapids, Mich.

**SAWS SWING**  
Oliver Mach. Co., Grand Rapids, Mich.

**STAYBOLT TOPS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**STAIRS, IRON**  
Canada Wire & Iron Goods Co.,  
Hamilton, Ont.

**STAMPINGS, SHEET BRASS, COP-  
PER, ALUMINUM AND STEEL**  
Dom. Forge & Stamping Co., Walkerville  
Homer & Wilson, Hamilton, Ont.

**STAMPING MACHINERY**  
Bliss Co., E. W., Brooklyn, N.Y.  
Brown, Roggs & Co., Hamilton, Can.  
Canada Machinery Corp., Galt, Ont.

**STAMPS, STEEL ALPHABET,  
FIGURES**  
Matthews, Jas. H. & Co., Hartford, Conn.  
Pritchard-Andrews Co., Ottawa, Can.

**SAFETY CYLINDERS**  
Oliver Mach. Co., Grand Rapids, Mich.

**STEAM APPLIANCES**  
Darling Bros., Ltd., Montreal, Quebec.

**STEAM SEPARATORS AND TRAPS**  
Can. Fairbanks-Morse Co., Montreal.

**STEEL BALLS**  
See Balls Steel.

**STEEL, CRUCIBLE TOOL**  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Illingworth Steel Co., John, New York.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto.  
Norton, Ralph B., Agent, Montreal.

**STEEL, CARBON, FERRO-  
TUNGSTEN**  
Armstrong, Whitworth of Can., Montreal.  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Baker & Co., Inc., H., Montreal, Que.  
Firth & Sons, Thos., Montreal, Que.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto.  
Norton, Ralph B., Agent, Montreal.  
Lathrop Electric Steel Co., Lathrop, Pa.  
Vanadium-Alloys Steel Co., Pittsburgh.

**STEEL CHROME VANADIUM**  
Blarcke Co., L. C., New York City.  
General Steel Co., Milwaukee, Wis.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Marshall, Son & Bunney, Toronto.

**STEEL CHROME NICKEL**  
General Steel Co., Milwaukee, Wis.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Marshall, Son & Bunney, Toronto.

**STEEL CASTINGS**  
Joliette Steel Co., Montreal, Que.  
Kennedy & Sons, Wm., Owen Sound.  
Electric Steel & Metals Co., Welland.  
Nova Scotia Steel & Coal Co., Windsor.  
Swedish Crucible Steel Co., Windsor.

**STEEL, COLD ROLLED**  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Can. Drawn Steel Co., Hamilton, Ont.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Norton, Ralph B., Agent, Montreal.  
Rice Lewis & Son, Toronto, Ont.  
Swedish Steel & Importing Co., Ltd.,  
Montreal.  
Union Drawn Steel Co., Hamilton, Ont.

**STEEL, NICKEL**  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Blarcke Co., L. C., New York City.  
Firth & Sons, Thos., Montreal, Que.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto.  
Norton, Ralph B., Agent, Montreal.

**STEEL, HIGH SPEED**  
Armstrong-Whitworth of Can., Montreal.  
Blarcke Co., L. C., New York City.  
Wm. Atkins & Co., Sheffield, Eng.  
Baker & Co., Inc., H., Montreal, Que.  
Can. Fairbanks-Morse Co., Montreal.  
H. A. Drury Co., Ltd., Montreal.  
Firth & Sons, Thos., Montreal, Que.  
Hawkrige Bros. Co., Boston, Mass.  
Illingworth Steel Co., J., New York.  
Lathrop Electric Steel Co., Lathrop, Pa.  
Marshall, Son & Bunney, Toronto, Ont.

Phelps, Lbl. Winnipeg, Man.  
Pilot Steel & Tool Co., Montreal, Que.  
Rice Lewis & Son, Toronto, Ont.  
Swedish Steel & Importing Co., Ltd.,  
Montreal.

**STEEL, CHROME, MANGANESE**  
Joliette Steel Co., Montreal, Que.

**STEEL, OPEN HEARTH**  
Illingworth Steel Co., John, New York.

**STEEL, CRUSHED**  
Pittsburgh Crushed Steel Co., Pittsburgh.

**STEEL, ROCK DRILL**  
Armstrong, Whitworth of Canada, Mon-  
treal, Que.

**STEEL, STRUCTURAL**  
Algoma Steel Corp., Sault Ste. Marie.  
MacKinnon Steel Co., Sherbrooke, Que.

**STEEL, TOOL**  
Armstrong, Whitworth of Can., Montreal.  
Atkins & Co., Wm. Sheffield, Eng.  
Blarcke Co., L. C., New York City.  
Baker & Co., Inc., H., Montreal, Que.  
Can. Fairbanks-Morse Co., Montreal.  
Drury Co., H. A., Montreal, Que.  
Firth & Sons, Thos., Montreal, Que.  
Hawkrige Bros. Co., Boston, Mass.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto, Ont.  
Norton, Ralph B., Agent, Montreal.  
Lathrop Electric Steel Co., Lathrop, Pa.  
Pilot Steel & Tool Co., Montreal, Que.  
Rice Lewis & Son, Toronto, Ont.  
Vanadium-Alloys Steel Co., Pittsburgh.

**STEEL, VANADIUM**  
Wm. Atkins & Co., Ltd., Sheffield, Eng.  
Armstrong, Whitworth of Can., Montreal.  
Drury, H. A., Co., Montreal, Que.  
Kaysor-Ellison & Co., Ltd., Montreal.  
Marshall, Son & Bunney, Toronto.  
Norton, Ralph B., Agent, Montreal.  
Vanadium-Alloys Steel Co., Pittsburgh.  
Wells Bros. of Can., Galt, Ont.

**STOCK RACKS FOR BARS,  
PIPING, ETC.**  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.

**STOCKS AND DIES**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**STOCKS, PIPE**  
A. B. Jardine & Co., Ltd., Hespeler, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Wells Bros. Co., of Canada, Galt, Ont.

**STRAIGHTENING MACHINERY**  
Baird Machinery Co., Bridgeport, Conn.  
Reitrams, Ltd., Edinburgh, Scotland.

**STRAND**  
Page Steel & Wire Co., Adrian, Mich.

**SURFACE PLATES**  
Brown & Sharpe Mfg. Co., Providence, R.I.

**STRUCTURAL STEEL WORKS**  
William Hamilton Co., Peterboro, Ont.

**SWEDGES AND WEDGES**  
Whitman & Barnes Co., St. Catharines.

**SWITCHBOARDS**  
Can. General Electric Co., Toronto, Ont.

**SWITCHES, RAILWAY**  
Can. Steel Foundries, Ltd., Montreal.

**TABLES, SAND-BLAST**  
Pangborn Corporation, Hagerstown, Md.

**TAPPING MACHINES (PNEU-  
MATIC)**  
Cleveland Pneumatic Tool Co., Toronto.

**TANKS, GASOLINE, KEROSENE  
AND OIL**  
Boswell Co., Ltd., S. F., Toronto, Ont.  
Dominion Bridge Co., Montreal, Que.  
Dom. Forge & Stamping Co., Walkerville.  
MacKinnon Steel Co., Sherbrooke, Que.  
St. Lawrence Welding Co., Montreal, Que.  
Marshall, Son & Bunney, Toronto.

**TANKS, LUBRICATING, OIL  
STORAGE**  
Rowser Co., Ltd., S. F., Toronto, Ont.

**TANKS, RUBBER CEMENT**  
Boswell Co., Ltd., S. F., Toronto, Ont.

**TANKS, STEEL, WATER PRESSURE**  
Boswell Co., Ltd., S. F., Toronto, Ont.  
Dominion Bridge Co., Montreal, Quebec.  
MacGovern & Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.  
St. Lawrence Welding Co., Montreal, Que.  
Toronto Iron Works, Ltd., Toronto.

**TANK WAGONS**  
MacKinnon Steel Co., Sherbrooke, Que.  
St. Lawrence Welding Co., Montreal.  
Toronto Iron Works, Ltd., Toronto.

**TANKS**  
Can. Ingersoll Rand Co., Ltd., Sherbrooke.  
Blarcke Co., L. C., New York City.  
MacKinnon Steel Co., Sherbrooke, Que.  
William Hamilton Co., Peterboro, Ont.

**TAPER PINS**  
Galt Machine Screw Co., Ltd., Galt, Ont.

**TAPES, MEASURING**  
James Chesterman & Co., Ltd., Sheffield,  
Eng.  
Rice Lewis & Son, Toronto, Ont.

**TAPPING MACHINES AND  
ATTACHMENTS**  
Reitram, John & Sons Co., Dundas.  
Bicknell-Thomas Co., Greenfield, Mass.  
Rudel-Belnap Mach. Co., Ltd., Montreal.  
Canada Machinery Corp., Galt, Ont.  
Garvin Machine Co., New York.  
The Geometric Tool Co., New Haven.  
J. H. Hall & Sons, Brantford, Ont.  
A. P. Jardine & Co., Hespeler, Ont.  
Landis Machine Co., Waynesboro, Pa.  
Modern Tool Co., Erie, Pa.  
Murphy Machine & Tool Co., Detroit.  
Niles-Bement-Pond Co., New York.  
Rickert-Shafer Co., Erie, Pa.  
National-Acme Co., Cleveland, Ohio.  
L. S. Starrett Co., Athol, Mass.  
Whitney Mfg. Co., Hartford, Conn.  
Williams & Wilson, Limited, Montreal.

**TAPES, MEASURING, STEEL AND  
WOVEN**  
Lufkin Rule Co. of Can., Windsor, Ont.

**TAPES, POCKET**  
Lufkin Rule Co. of Can., Windsor, Ont.

**TAPS, ADJUSTABLE**  
Baker & Co., Inc., H., Montreal, Que.  
Butterfield & Co., Inc., Rock Island, Que.  
Geometric Tool Co., New Haven.  
Modern Tool Co., Erie, Pa.  
Murphy Machine & Tool Co., Detroit.  
Pilot Steel & Tool Co., Montreal, Que.  
Victor Tool Co., Waynesboro, Pa.

**TAPS, GUN, HAND, BOILER**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**TAPS, MACHINE RELIEVED**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**TAPS, MACHINE SCREW**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**TAPS, PIPE**  
Butterfield & Co., Inc., Rock Island, Que.  
Atkins & Co., Ltd., Wm. Sheffield, Eng.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Marshall, Son & Bunney, Toronto.  
Wells Bros. of Can., Galt, Ont.

**TAPS, STAYBOLT, TAPPER**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Wells Bros. of Can., Galt, Ont.

**TAPS, DIES AND WRENCHES**  
Butterfield & Co., Inc., Rock Island, Que.  
Blarcke Co., L. C., New York City.  
Can. Fairbanks-Morse Co., Montreal.  
Cleveland Twist Drill Co., Cleveland.  
Foss Mchry & Sply. Co., G. F., Montreal.  
Geometric Tool Co., New Haven.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Jardine & Co., A. B., Hespeler, Ont.  
Landis Machine Co., Waynesboro, Pa.  
Morse Twist Drill & Mchry Co., New  
Bedford, Mass.  
Murphy Machine & Tool Co., Detroit.  
Pratt & Whitney Co., Dundas, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Starrett Co., L. S., Athol, Mass.  
Taylor, J. A. M., 318 Stair Bldg., Toronto.  
Wells Bros. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**TAP EXTRACTORS**  
Walton Co. The, Hartford, Conn.

**THERMOMETERS, INDUSTRIAL  
ENGRAVED TEMPERATURE  
AND PRESSURE**  
Taylor Instrument Co., Rochester, N.Y.

**THERMOMETERS, RECORDING  
AND INDEX**  
Bristol Co., Waterbury, Conn., U.S.A.  
Taylor Instrument Co., Rochester, N.Y.

**TESTING INSTRUMENTS,  
METALLURGICAL**  
Shore Instrument & Mfg. Co., New York.

**TENOVERS**  
Oliver Machy. Co., Grand Rapids, Mich.

**TESTING LABORATORIES**  
Toronto Testing Laboratory, Toronto.

**THREAD-CUTTING MACHINES**  
Can. Fairbanks-Morse Co., Montreal.  
Curtis & Curtis Co., Bridgeport, Conn.  
Garlock-Walker Mach. Co., Ltd., Toronto.  
Geometric Tool Co., New Haven.  
Jardine & Co., Ltd., A. B., Hespeler, Pa.  
Landis Machine Co., Waynesboro, Pa.  
National-Acme Co., Cleveland, Ohio.  
National Machy. Co., Tiffin, Ohio.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. Co. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

**THREADING TOOLS**  
Butterfield & Co., Inc., Rock Island, Que.  
Greenfield Tap & Die Corp., Greenfield,  
Mass.  
Landis Machine Co., Waynesboro, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Wells Bros. of Canada, Galt, Ont.

Williams & Co., J. H., Brooklyn, N.Y.

**THREADING MACHINES FOR  
BOLTS, NUTS AND PIPES**  
Greenfield Tap & Die Corp., Greenfield.  
Wells Bros. Co. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**THREAD MILLING MACHINES**  
Taft-Pierce Mfg. Co., New York, N.Y.  
Gray Ball Bearing Co., Ltd., Toronto.  
Smalley-General Co., Bay City, Mich.

**THUMB SCREWS AND NUTS**  
See Screws.

**TINSMITHS' TOOLS**  
Brown, Roggs & Co., Hamilton, Can.  
Williams & Wilson, Ltd., Montreal, Que.

**TIRE BENDERS**  
Jardine & Co., Ltd., A. B., Hespeler.

**TIRE SETTING MACHINES,  
HYDRAULIC**  
Perrin, Ltd., William R., Toronto.  
West Tire Setter Co., Rochester, N.Y.

**TOOL CASES**  
Rice Lewis & Son, Toronto, Ont.

**TOOL HOLDERS**  
Aikenhead Hardware Co., Toronto, Ont.  
Cleveland Twist Drill Co., Cleveland.  
Armstrong Bros. Tool Co., Chicago.  
Gisholt Machine Co., Madison, Wis.  
Modern Tool Co., Erie, Pa.  
Pratt & Whitney Co., Dundas, Ont.  
Rice Lewis & Son, Toronto, Ont.  
Williams & Co., J. H., Brooklyn, N.Y.

**TOOL POSTS, LATHE**  
Armstrong Bros. Tool Co., Chicago.  
Williams & Co., J. H., Brooklyn, N.Y.

**TOOL ROOM PARTITIONS**  
Canada Wire & Iron Goods Co., Hamilton.

**TOOLS, BENDING**  
Peck, Stow & Wilcox Co., Southington.

**TOOLS, BLACKSMITHS'**  
A. B. Jardine & Co., Ltd., Hespeler, Ont.  
Rice Lewis & Son, Toronto, Ont.

**TOOLS, ADJUSTABLE BORING**  
Kelly Reamer Co., Cleveland, O.  
Williams & Wilson, Ltd., Montreal, Que.

**TOOLS, ELECTRIC**  
Independent Pneumatic Tool Co., Chicago.  
Williams Machy. Co., A. R., Toronto.  
Ford-Smith Machine Co., Hamilton, Ont.  
U. S. Electrical Tool Co., Cincinnati, O.

**TOOLS, FORMING**  
Davidson Tool Mfg. Co., New York, N.Y.

**TOOLS, LATHE, PLANER,  
SLOTTER**  
Armstrong Bros. Tool Co., Chicago.  
Gisholt Machine Co., Madison, Wis.  
Williams & Co., J. H., Brooklyn, N.Y.

**TOOLS, SCREW MACHINE**  
Foster Machine Tool Co., Elkhart, Ind.

**TORCHES, BLOW**  
Int. Mach. & Supply Co., Ltd., Montreal.

**TORCHES, STEEL**  
Armstrong, Whitworth of Can., Montreal.  
Prest-O-Lite Co., Inc., Toronto, Ont.  
Welding & Supplies Co., Montreal, Que.

**TORCHES, GASOLINE, KEROSENE  
AND ALCOHOL**  
Turner Brass Works, Screamore, Ill.

**TRACK SYSTEMS**  
Morris Crane & Hoist Co., Herbert,  
Niagara Falls, Ont.  
Northern Crane Works, Walkerville.

**TRADE MARKS**  
Shipman & Co., H. C., Ottawa.

**TRANSFORMERS**  
Can. General Electric Co., Toronto, Ont.  
MacGovern & Co., Montreal, Que.

**TRANSMISSION CHAIN**  
Morris Chain Co., Ithaca, New York.

**TRANSMISSION MACHINERY**  
American Pulley Co., Philadelphia, Pa.  
Can. Link-Belt Co., Toronto, Ont.  
Can. Fairbanks-Morse Co., Montreal.  
Can. Drawn Steel Co., Hamilton, Ont.  
Coventry Chain Co., Coventry, England.  
Hamilton Gear & Machine Co., Toronto.  
Jones & Glasco, Montreal.  
Kennedy & Sons, Wm., Owen Sound, Ont.  
Morse Chain Co., Ithaca, N.Y.  
Wilson & Co., J. C., Belleville, Ont.  
Williams Machinery Co., A. R., Toronto.  
Williams & Wilson, Ltd., Montreal, Que.

**TRANSMISSION ROPE**  
Jones & Glasco, Montreal, Que.  
MacKinnon Steel Co., Ltd., Sherbrooke.  
Wilson & Co., J. C., Belleville, Ont.

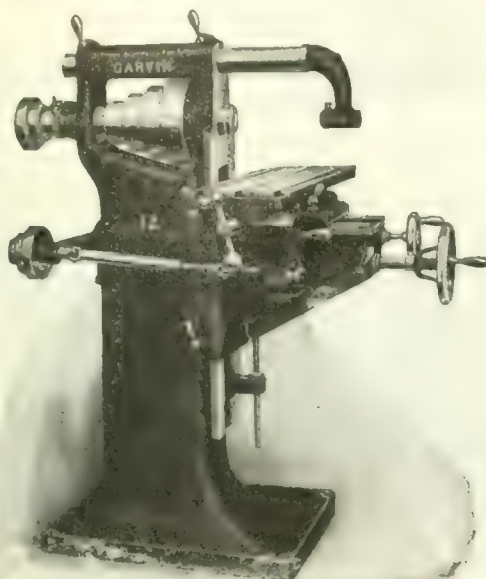
**TRANSMISSION TOWERS**  
Curtis Pneumatic Machy. Co., St. Louis.  
Dominion Bridge Co., Montreal, Que.  
MacKinnon Steel Co., Sherbrooke, Que.  
Northern Crane Works, Walkerville.  
Tallman Brass & Metal Co., Hamilton.

**TROLLEYS**  
Morris Crane & Hoist Co., Ltd., Herbert,  
Niagara Falls, Ont.  
Wright Mfg. Co., Lisbon, Ohio.



# GARVIN

## No. 12 PLAIN MILLING MACHINE ALL LIGHT MANUFACTURING



This machine is built especially strong and substantial for a tool of its capacity, and has many valuable features worthy of special mention. The slide is fitted with a quick pitch screw, giving one inch per turn. This combines the rigidity of a rack feed with the steadiness of the screw feed. The table has an oil pan all around it, with finished edges—automatic feed, trip and reverse—adjustable nut on the feed screw to take wear—the Feed Screw is hardened.

Adjustments ..... 18 x 6 x 15 in.

For Further Information ASK YOUR DEALER OR  
WRITE US DIRECT

IMMEDIATE DELIVERIES

Send for Complete Catalog

No. 12—Plain Milling Machine—Use Code Abrade

Manufactured by

# THE GARVIN MACHINE COMPANY

Spring and Varick Streets (Visitors Welcome) 50 Years New York City

## BUYERS' DIRECTORY

**TRUCKS, FACTORY, FREIGHT, ETC**  
Canada Machinery Corp., Galt, Ont.  
Chapman Double Ball Bearing, Toronto.  
MacKinnon Steel Co., Sherbrooke, Que.  
Rice Lewis & Son, Toronto, Ont.

**TRUCKS, LUMBER AND KILN**  
Swedish Steel & Engineering Co., Montreal.  
Northern Crane Works, Walkerville.

**TUBING, SEAMLESS, BRASS AND COPPER**  
Standard Tube & Pipe Co., Woodstock.  
Tallman Brass & Metal Co., Hamilton.

**TUBING COILERS, FLEXIBLE METAL**

Almond Mfg. Co., Ashburnham, Mass.  
**TURRET MACHINES, LATHES**  
Brown & Sharpe Mfg. Co., Providence.  
Garlock-Walker Machinery Co., Toronto.

Greenfield Tap & Die Corp., Greenfield.  
Oliver Mach. Co., Grand Rapids, Mich.  
Leatt & Whitney, Hartford, Conn.  
Wells Bros. of Canada, Galt, Ont.  
Williams & Wilson, Ltd., Montreal, Que.

**TURBINES, HORIZONTAL**

Wilson & Co., J. C., Belleville, Ont.

**TURBO GENERATOR UNITS**

MacGovern & Co., Montreal, Que.  
Warner & Swasey, Cleveland, O.  
Garvin Machine Co., New York.

**TURNBUCKLES**

Canada Fibre & Eng. Ltd., Welland.  
J. Morrow Screw & Nut Co., Ingersoll, Ont.  
Rice Lewis & Son, Toronto, Ont.

**TURNABLES**

Can. Link-Belt Co., Toronto, Ont.  
Elec. Steel & Metals, Welland, Ont.  
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

**UPSETTING AND BENDING MACHINERY**

Bertram & Sons Co., John, Pontias.

Brown, Rogers Co., Ltd., Hamilton, Can.

Ford Smith Machine Co., Hamilton, Ont.

Garlock-Walker Machinery Co., Toronto.

Jarline & Co., A. B., Hespeler, Ont.

National Machy. Co., Tiffin, O.

Canada Machinery Corp., Galt, Ont.

Niles-Rement Pond Co., New York.

Williams Machy. Co., A. R., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**VALVE LEATHERS**

Graton & Knight Mfg. Co., Montreal.

**VALVE GRINDERS (PNEUMATIC)**

Cleveland Pneumatic Tool Co., Toronto.

**VALVES, HYDRAULIC**

Metalwork Mfg. Co., Detroit, Mich.

**VENTILATING APPARATUS**

Brantford Oven & Rack Co., Brantford.

Can. Blower & Forge Co., Kitchener, Ont.

Williams Machy. Co., A. R., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**VENTILATORS**

H. H. Robertson, Ltd., St. Catharines, Ont.

**WISE STANDS, PORTABLE**

Williams & Co., J. H., Brooklyn, N.Y.

**WISES, BENCH**

Aikenhead Hardware Co., Toronto, Ont.

Becker Milling Machine Co., Boston, Mass.

Ess Machy. & Spdy Co., G. F., Montreal.

Williams & Wilson, Ltd., Montreal, Que.

**WISES, PIPE**

Atkins & Co., Ltd., Wm., Sheffield, Eng.

Aspenhead Hardware Co., Toronto, Ont.

Barrett & Co., Rock Island, Que.

Marshall Son & Remner, Toronto.

Wells Bros. Co. of Canada, Galt, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**WISES, MILLING MACHINE**

Brown & Sharpe Mfg. Co., Providence, R.I.

**WISES, PLANNER AND SHAPER**

Aikenhead Hardware Co., Toronto, Ont.

Skinner Chuck Co., New Britain, Conn.

Williams & Wilson, Ltd., Montreal, Que.

**WASHER MACHINES**

National Machy. Co., Tiffin, Ohio.

**WASHERS**

Atkins & Co., Ltd., Wm., Sheffield, Eng.

Barnes, Wallace, Co., Bristol, Conn.

Graton & Knight Mfg. Co., Worcester.

Kaiser-Ellison & Co., Ltd., Montreal.

Marshall Son & Remner, Toronto.

J. Morrow Screw & Nut Co., Ingersoll, Ont.

Newton, Ralph B., Agent, Montreal.

London Bolt & Nuts Wks., London, Ont.

Steel Co. of Canada, Ltd., Hamilton, Ont.

**WASTE**

Wilkinson & Kompass, Hamilton, Ont.

Wood Turret Machine Co., Brazil, Ind.

**WATER-INTAKE SCREENS**

Can. Link-Belt Co., Toronto, Ont.

**WATER TOWERS**

Toronto Iron Works, Ltd., Toronto.

**WELDING, WIRE**

Page Steel & Wire Co., Adrian, Mich.

**WELDING, ELECTRIC, SPOT, BUTT, ETC.**

St. Lawrence Welding Co., Montreal.

Welding & Supplies Co., Montreal, Que.

Tabor Mfg. Co., Philadelphia, Pa.

**WELDING MASKS**

Strong, Kennard & Nutt Co., Cleveland.

**WELDING GOGGLES**

Strong, Kennard & Nutt Co., Cleveland.

**WELDING RODS AND WIRE**

Page Steel & Wire Co., Adrian, Mich.

**WELDING SUPPLIES**

Union Carbide Co., Toronto, Ont.

**WHEELS, CAR, STEEL**

Elec. Steel & Metals, Welland, Ont.

**WHEELS, SPROCKET AND TRACTION**

Can. Link-Belt Co., Toronto, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**WHEELS, TURBINE, WATER**

Elec. Steel & Metals, Welland, Ont.

**WHEELS, PRESSED STEEL**

American Puller Co., Philadelphia, Pa.

**WHEEL TRUING TOOLS**

Wheel Truing Tool Co., Windsor, Ont.

Williams & Wilson, Ltd., Montreal, Que.

**WINCHES**

Can. Ingersoll-Rand Co., Sherbrooke, Que.

Hall & Sons, John H., Brantford.

Kennedy & Son, Wm., Owen Sound, Ont.

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

Northern Crane Works, Walkerville.

**WIRE, CAST STEEL AND MUSIC**

Kaiser-Ellison & Co., Ltd., Montreal.

Norton, Ralph B., Agent, Montreal.

**WIRE COILING AND POINTING MACHINERY**

Baird Machine Co., Bridgeport, Conn.

Shuster Co., F. B., New Haven, Conn.

**WIRING MACHINES**

Quebec Wire Co., St. Marys, Ohio.

**WRENCHES, PIPE, POWER**

Page Steel & Wire Co., New York, N.Y.

**WIRE CLOTH AND PERFORATED METALS**

Canada Wire & Iron Goods, Hamilton.

Page Steel & Wire Co., New York, N.Y.

**WIRE FENCING**

**WIRE, COPPER, CLAD STEEL**

**WIRE, LINK FABRIC**

Page Steel & Wire Co., Adrian, Mich.

**WIRE FORMING AND STAMPING MACHINERY**

Baird Machine Co., Bridgeport, Conn.

Brown, Boggs Co., Ltd., Hamilton, Can.

Shuster Co., F. B., New Haven, Conn.

**WIRE NAILS**

Page Steel & Wire Co., New York, N.Y.

Parmenter & Bell, Co., Gananoque.

Steel Co. of Canada, Ltd., Hamilton, Ont.

**WIRE NAIL MACHINERY**

National Machy. Co., Tiffin, Ohio.

**WIRE, SPARK PLUG, MANGANESE NICKEL, COPPER NICKEL, MONEL METAL**

Can. Driver Harris Co., Ltd., Walkerville.

**WIRE SPRING**

Page Steel & Wire Co., Adrian, Mich.

**WIRE STEEL, BRASS, COPPER**

Page Steel & Wire Co., New York, N.Y.

Steel Co. of Canada, Ltd., Hamilton, Ont.

**WIRE, TELEPHONE, TELEGRAPH, GALVANIZED AND ELECTRICAL**

Page Steel & Wire Co., Adrian, Mich.

**WIRE, WEAVING, MONEL METAL, BRASS, COPPER, GOLDEN**

**BRONZE, HIGH BRASS, LOW BRASS, NICKEL**

Can. Driver Harris Co., Ltd., Walkerville.

**WOOD BORING MACHINES**

Canada Machinery Corp., Galt, Ont.

Cleveland Pneumatic Tool Co. of Canada, Toronto.

Garlock-Walker Machinery Co., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**WIRE STRAIGHTENERS AND CUTTERS**

Baird Machine Co., Bridgeport, Conn.

Brown, Boggs Co., Ltd., Hamilton, Can.

Shuster Co., F. B., New Haven, Conn.

**WOODWORKING MACHINERY**

Canada Machinery Corp., Galt, Ont.

Can. Patankins Morse Co., Montreal.

Can. Ingersoll-Rand Co., Sherbrooke, Que.

Garlock-Walker Machinery Co., Toronto.

Oliver Machy. Co., Grand Rapids, Mich.

Silver Mfg. Co., Salem, Ohio.

Williams Machy. Co., A. R., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

**WOOD TRIMMERS AND LATHES**

Oliver Machy. Co., Grand Rapids, Mich.

**WOOD MILLING MACHINES AND SHAPERS**

Oliver Machy. Co., Grand Rapids, Mich.

**WRENCHES**

Williams & Co., J. H., Brooklyn, N.Y.

Armstrong Bass Tool Co., Chicago, Ill.

Butterfield & Co., Rock Island, Que.

Canada Fibre & Eng. Ltd., Welland.

Keystone Mfg. Co., Buffalo, N.Y.

Wells Bros. of Canada, Galt, Ont.

Whitman & Barnes Co., St. Catharines.

Whitman & Barnes Mfg. Co., Akron, O.

**WOVEN STEEL PARTITIONS**

Page Steel & Wire Co., Adrian, Mich.

**WRENCHES, AUTOMOBILE, NARROW JAW, MONKEY, SCREW**

Morrow Screw & Nut Co., Ingersoll, Ont.

Whitman & Barnes Co., St. Catharines.

**WRENCHES, PIPE, MONKEY, TAP AND POWER**

Atkins & Co., Ltd., Wm., Sheffield, Eng.

Aikenhead Hardware Co., Toronto, Ont.

Marshall Son & Remner, Toronto.

Park, Steel & Wire Co., Southampton.

Rice Lewis & Son, Toronto, Ont.

Wells Bros. of Canada, Galt, Ont.

Whitman & Barnes Co., St. Catharines.

Williams & Co., J. H., Brooklyn, N.Y.

Keystone Mfg. Co., Buffalo, N.Y.

Whitman & Barnes Mfg. Co., Akron, O.

Williams & Wilson, Ltd., Montreal, Que.

**WRENCHES, SOCKET**

Williams Machy. Co., A. R., Toronto.

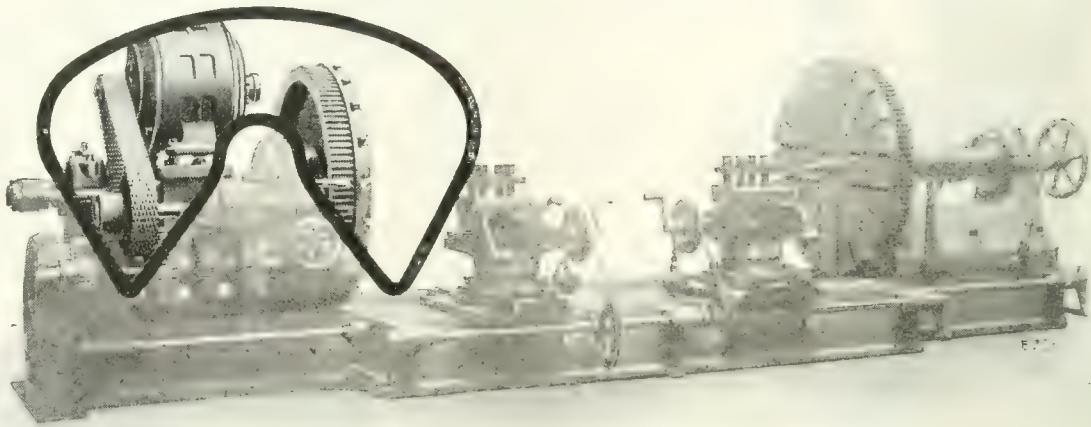
Williams & Co., J. H., Brooklyn, N.Y.

Williams & Wilson, Ltd., Montreal, Que.



# "THE COVENTRY" CHAINS

Have you Considered the Advantages of  
**NOISELESS CHAIN TRANSMISSION?**



"The Coventry" Noiseless Chain transmitting Power on a Tangye Lathe built for heavy work.  
Note the compact arrangement of the drive.

**"THE COVENTRY" CHAIN CO., LTD., COVENTRY, ENGLAND**

CANADIAN AGENTS—TAYLOR & ARNOLD, LTD., BANK OF TORONTO BUILDING, MONTREAL

# STEEL TUBING

FOR Agricultural Implements, Trolley Arms, Fence Posts, Bedsteads—and all kinds of manufacturing purposes. Reliable quality, uniform in size, 14 to 20 gauge, size  $\frac{3}{8}$ " to 2" outside diameter.

**STANDARD TUBE & FENCE COMPANY, LTD.**  
**WOODSTOCK, ONT.**

## INDEX TO ADVERTISERS

Continued from Page 160

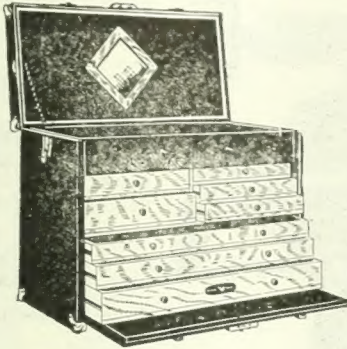
Leitch Bros. & Metal Co. . . . .	91	United Hammer Co. . . . .	136	Walton Co., The . . . . .	16	Williams & Co., J. H. . . . .	132
Tool & Machine Tool Co. . . . .	140	United States Electrical Tool Co. . . . .	42	Wagner & Swasey Co. . . . .	33	Williams Tool Co. . . . .	114
Tolson Tool Co., J. A. M. . . . .	91	United States Machine Tool Co. . . . .	39	Waltham, City of, S.A., S.R., S.L.A., S.D. . . . .	8	Willson Mfg. Co., T. A. . . . .	137
Power, Frank, Inc. . . . .	89	Universal Grinding Machine Co. . . . .	138	Welding & Supplies Co. . . . .	91	Wilson & Co., J. C. . . . .	145
Power, Iron Works . . . . .	90	V		West Tire Setter Co. . . . .	118	Wilt Twist Drill Co. . . . .	7
Power Testing Laboratory, Ltd. . . . .	158	Vanadium Alloy Steel Co. . . . .	26	Wheel Truing Tool Co. . . . .	137	Wisconsin Electric Co. . . . .	158
Toronto Tool Co. . . . .	99	Victoria Foundry Co. . . . .	86	Whitcomb-Blaissell Mach. Tool Co. . . . .	129	Wood Turret Machine Co. . . . .	138
Traction Pump Co. . . . .	140	Vida Mfg. Co. . . . .	80C	Whitney Mfg. Co. . . . .	10	Worcester Lathe Co. . . . .	25
L		W		Wickes Bros. . . . .	159	Z	
Union Mfg. Co. . . . .	150	Walscott Lathe Co. . . . .	41	Williams & Kompass . . . . .	157	Zenith Coal & Steel Products . . . . .	88
				Williams Co., A. R. . . . .	71		



# Ask for Quotations on Iron and Steel

We have in stock for immediate shipment the highest grade Bar Iron, Black and Galvanized Sheet Iron, Machine Steel, Cast Steel, High Speed Steel, Cold Rolled Steel, etc.

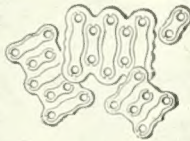
## Machinist's Tool Chests



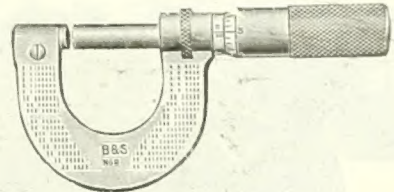
Time and again skilled machinists have remarked on the strength of construction and compact design of our Tool Chests. Have us give you full particulars.

## CRESCENT BELT FASTENERS

Clinch beneath the surface of the belt on the pulley side—no part in contact with the pulley. They maintain uniform grip the entire width of belt and never weaken from wear.



## Micrometer and other fine tools



Select from such wholly dependable makes as Starrett or Brown & Sharpe, or from other makes you have proven in your own shop to be most durable and efficient. Our stocks are complete.

## "Victor" Hack Saw Blades for Tough Metal



Durable, fast-cutting blades that you can rely upon to cut true through toughest metals. Users have found that these blades increase every day's output and serve much longer than ordinary blades.

*Write us about your requirements*

# RICE LEWIS & SON, LIMITED

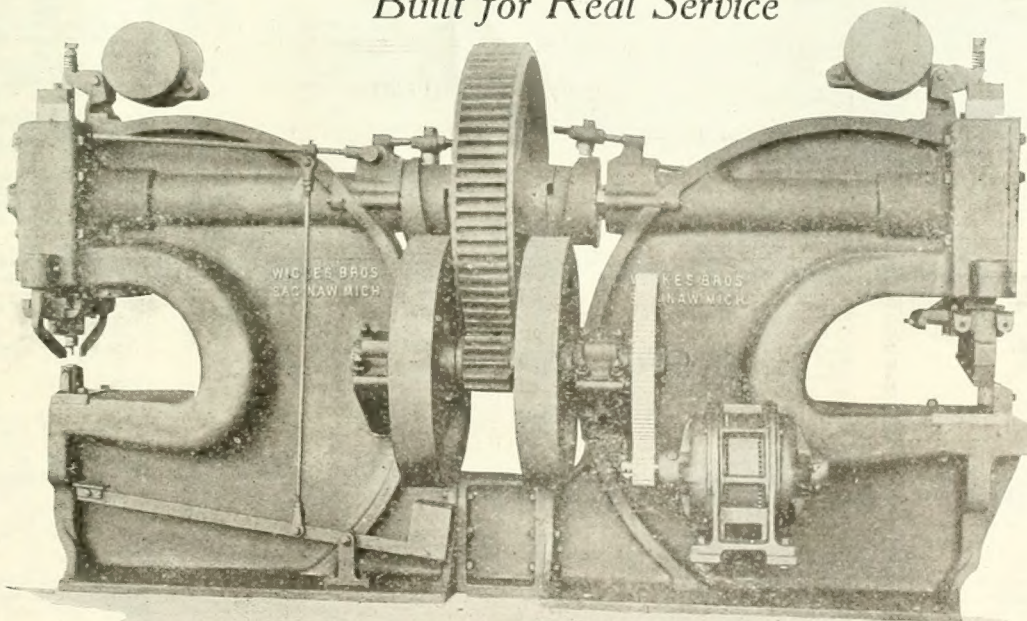
Established 1847

TORONTO, ONT.

19 Victoria Street

## WICKES' Heavy Duty Double Punch

*Built for Real Service*



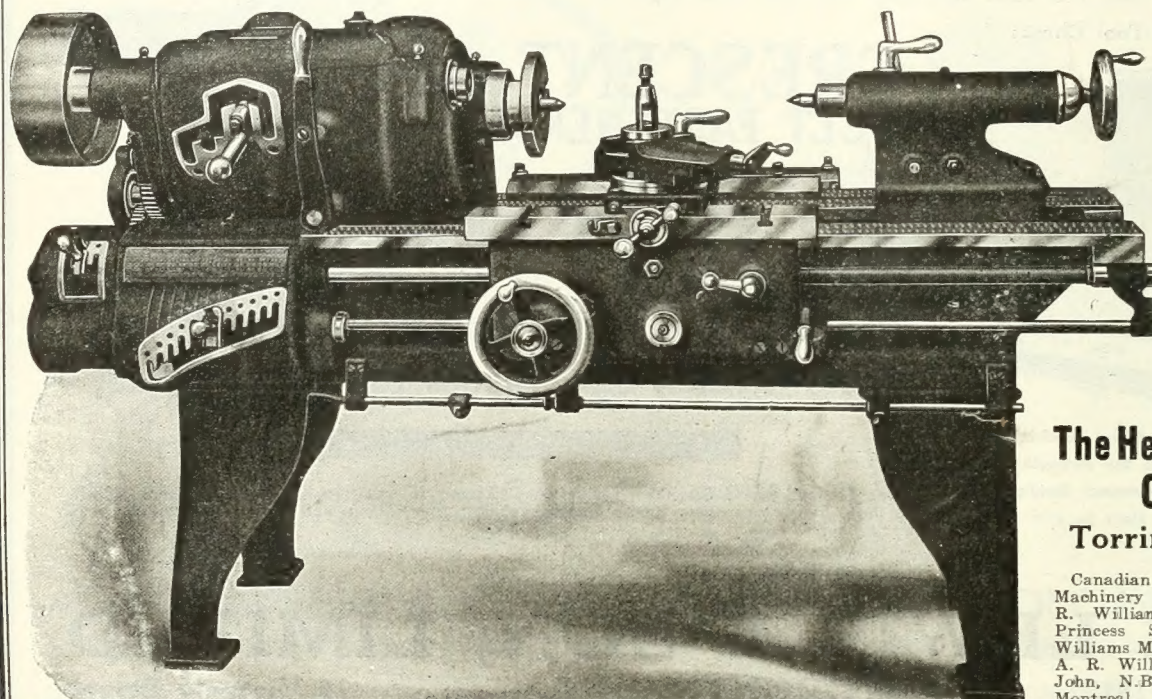
We also manufacture High Grade Horizontal and Vertical Rolls, Angle Rolls, Single Punches, Shears, Spruce Cutters Radial Wall Drills or Counter-sinking Machines, Flanging Clamps and Heavy Duty Engine Lathes. *Ask for Catalogue.*

**WICKES BROS., SAGINAW, MICH., U.S.A.**



# HENDEY 18-inch GEARED HEAD LATHE

8 mechanical changes of speed for spindle with driving shaft running at constant speed, 4 direct and 4 through back gears.



36 DIFFERENT THREADS AND FEEDS are had through Mounted Change Gearing, each change being quickly made through controlling handles in Gear Boxes.

BEFORE PURCHASING A NEW LATHE INVESTIGATE THE HENDEY SERVICE.

WE'LL HELP YOU BY FURNISHING LIST OF USERS.

Write for descriptive circular.

**The Hendey Machine Company**  
Torrington, Conn.

Canadian Agents: A. R. Williams Machinery Co., Toronto, Ont.; A. R. Williams Machinery Co., 260 Princess St., Winnipeg; A. R. Williams Machinery Co., Vancouver; A. R. Williams Machinery Co., St. John, N.B.; Williams & Wilson, Montreal.

## INDEX TO ADVERTISERS

<b>A</b>		Classified Advertising .....	92	Hardinge Bros. ....	120	Modern Tool Co. ....	163
Acme Machine Tool Co. ....	8	Cleveland Twist Drill Co. ....	122, 123	Hawthorne Bros. ....	86	Morrow Screw & Nut Co., J. ....	71
Aikenhead Hardware Co. ....	75	Clippert Belt Lacer Co. ....	37	Heald Machine Co. ....	25	Morris Crane & Hoist Co., Herbert ..	28
Algoma Steel Corp. Co. ....	4	Commercial Carving Co. ....	191	Henry Machine Co. ....	169	Morse Chain Co. ....	139
Allentown Experimental Works. ....	88	Consolidated Optical Co. ....	137	Henry & Wright Mfg. Co. ....	126	Morse Twist Drill Co. ....	145
Almond Mfg. Co. ....	129	Cook, A. S. ....	137	Hepburn, John T. ....	145	Mouton Mfg. Co. ....	97
American Lead Pencil Co. ....	101	Coventry Chain Co. ....	158	Hinckley Machine Works ....	137	<b>N</b>	
American Pipe Bending Machine Co. ....	178	Curtis Pneumatic Mach. Co. ....	29	Hoyer Mfg. Co. ....	24	National Acme Co. ....	96
American Juley Co. ....	140	Cushman Chuck Co. ....	130	Homer & Wilson ....	91	Nicholson File ....	134
Armstrong Bros. Tool Co. ....	118	<b>D</b>		Hoyt Metal Co. ....	24	Niles-Bement-Pond, Inside front cover	
Atlas Press Co. ....	87	Darling Bros., Ltd. ....	136	Hull Iron & Steel Foundries, Ltd. ....	113	Northern Crane Works ....	28
Audel & Co., Theo. ....	87	Davidson Mfg. Co., Ltd., The Thos. ....	71	Hunter Saw & Machine Co. ....	31	Norton, A. O. ....	138
Aurora Tool Works ....	149	Davidson Tool Mfg. Corp. ....	39	Hungerford Brass & Copper Co. ....	85, 88	Norton Co. ....	42
<b>B</b>		Davis-Bourmonville Co. ....	139	U. T. ....	21	Nova Scotia Steel & Coal Co. ....	18
Baird Machine Co. ....	138	Diamond Saw & Stamping Works. ....	87	<b>I</b>		<b>O</b>	
Barnes Co., W. F. & John ....	149	Dickow, F. C. ....	87	Illingworth Steel Co., John ....	13	Oakley Chemical Co. ....	5
Barnes Co., Wallace ....	100	Dom. Forge & Stamping Co., Ltd. ....	111	Illinois Tool Works ....	79	Oliver Machinery Co. ....	109
Beatty & Sons, M. ....	81B	Dom. Foundries & Steel Co. ....	111	Independent Pneumatic Tool Co. ....	149	<b>P</b>	
Becker Milling Machine Co. ....	174	Dom. Forge & Stamping Co., Ltd. ....	111	Indicating Calipers Co. ....	125	Page Steel & Wire Co. ....	139
Bell-Que Industrial Furnace Co. ....	151	Drury Co., H. A. ....	19	Ingersoll File Co. ....	111	Pangborn Corporation ....	138
Bernard Industrial Co., A. ....	132	Dunbar Bros. Co., The ....	10	International Malleable Iron Wks. ....	81	Panmenier & Buloch Co. ....	138
Bertram & Sons Co., John ....	1	<b>E</b>		International Mach. & Supply Co. ....	99	Peenless Machine Co. ....	32
Berthams, Ltd. ....	87	Eastern Machine Screw Corp. ....	130	International Machinery Exposition. ....	88	Perrin, Wm. R. ....	124
Bicknell-Thomas Co. ....	128	Electric Steel & Metals Co. ....	18	Jacobs Mfg. Co. ....	127	Philadelphia Gear Works ....	139
Blanche Co., L. C. ....	35	Elliot & Whitehall ....	91	Jardine & Co., A. B. ....	13	Pilot Steel & Tool Co. ....	26
Bowser Co., Ltw. S. F. ....	126	Espen Lucas Machine Works ....	26	Johnson Machine Co., Carlyle. ....	13	Pink Co., Thomas ....	116
Brantford Emery Wheel Co. ....	139	<b>F</b>		Joliet Steel Co. ....	137	Plews, Lin. Co. ....	87
Brantford Oven & Rack Co. ....	83	Fellows Gear Shaper Co. ....	147	Jones & Glasco ....	97	Positive Clutch & Pulley Works. ....	137
Bristol Company ....	136	Fetherstonhaugh & Co. ....	85	Joyce-Koebel Co. ....	94	Praet & Whitney .... Inside front cover	
Bristol Machine Tool Co. ....	125	Finth & Sons, Thos. ....	9	<b>K</b>		Prent-O-Lite Co. of Canada ....	129
Broadbent & Sons, Ltd., Thomas. ....	135	Fitchburg Grinding Mach. Co. ....	138	Katie Foundry Co. ....	24	Puro Sanitary Drinking Fountain Co. ....	86
Brockville Foundry Co. ....	138	Ford Chain Block & Mfg. Co. ....	29	Kayser, Ellison & Co. ....	12	<b>Q</b>	
Brown & Sharpe Mfg. Co. ....	143	Ford-Smith Machine Co. ....	10	Kearney & Trecker Co. ....	110	Quickwork Co. ....	124
Brown, Boggs Co. ....	11	Forst Mach. & Supply Co., Geo. F. ....	10	Kelly Reamer Co. ....	27	<b>R</b>	
Brown Engineering Corp. ....	91	Forst Mfg. Co. ....	136	Kemp Smith Mfg. Co. ....	2	Racine Tool & Machine Co. ....	32
Bryant Chucking Grinder Co. ....	136	Forst Mfg. Co. ....	136	<b>L</b>		Race Lewis & Son ....	159
Budden, Hanbury A. ....	85	Franklin Mfg. Co. ....	133	Lancashire Dynamo & Motor Co. ....	115	Rickett-Shaffer Co. ....	128
Mutterfield & Co., Inc. ....	151	<b>G</b>		Landis Machine Co. ....	95	Rockwell Co., W. S. ....	136
<b>C</b>		Gar Machine Screw Co. ....	95	Landis Tool Co. ....	95	Roselson Machine & Tool Co. ....	15
Can. Billings & Spencer ....	83C	Garlock-Walker Machy. Co. ....	89	Lathro Electric Steel Co. ....	29	<b>S</b>	
Canada Foundries & Forgings, Ltd. ....	13	Garvin Machine Co. ....	157	Lindsay, John ....	87	Semple, Robert ....	128
Canada Machinery Corporation. ....		Geometric Tool Co. ....	73	Long & Allstatter ....	103	Seneca Falls Mfg. Co. ....	101
<b>Outside back cover</b>		Gilbert & Barker Mfg. Co. ....	175	Lufkin Lathe Co. ....	129	Shuster Co., F. B. ....	124
Canada Metal Co. ....	130	Gisholt Machine Co. ....	44, 45	LLynd-Farguhar Co. ....	129	Sidney Tool Co. ....	118
Canada Wire & Iron Goods Co. ....	111	Goodyear Tire & Rubber Co. ....	22, 23	<b>M</b>		Silver Mfg. Co. ....	117
Canadian Cartridge Co. ....	113	Gooley & Ellund, Inc. ....	197	MacLean's Magazine ....	175	Sinohds Canada Saw Co. ....	129
Can. Consolidated Rubber Co. ....	83	Grant Gear Works ....	138	Manitoba Steel Foundries, Ltd. ....	136	Skinner Chuck Co. ....	129
Can. Desmond-Stephan Co. ....	49	Grant Mfg. & Machine Co. ....	126	Marion & Marion ....	85	Smalley-General Co., Inc. ....	35
Can. Drawn Steel Co. ....	91	Graton & Knight Mfg. Co. ....	43	Marshalltown Mfg. Co. ....	114	Smith, N. ....	85
Can. Driver Harris Co., Ltd. ....	92	Greb Company ....	85	Marshall, Son & Bunnay ....	19	Smith, W. T. ....	86
Can. Fairbanks-Morse Co. ....	46	Greenfield Machine Co. ....	115	Martin Machinery Co. ....	99	Standard Optical Co. ....	34
Can. Graton & Knight Co. ....	43	Greenleafs, Ltd. ....	87	Mathews & Co., Jas. H. ....	49	Standard Tube & Fence Co. ....	158
Can. Ingersoll-Rand Co. ....	6	<b>H</b>		McDougall Co., Ltd., R. ....	138	Steel Co. of Canada ....	3
Can. Sander Mfg. Co. ....	140	Hall & Sons, Ltd., John H. ....	14	McLaren Belting Co., J. C. ....	138	Steeds Turret Machine Co. ....	112
Can. SKF Co., Ltd. ....	15, 17	Hamilton Co., Wm. ....	99	Mechanical Engineering Co. ....	176	St. Lawrence Welding Co. ....	128
Can. Steel Foundries Ltd. ....	9	Hamilton Gear Co., Ltd. ....	194	Metallwood Mfg. Co. ....	38	Steel Co., D. H. ....	136
Can. Vinsky Co. ....	137	Hanna & Co., M. A. ....	9	Milwaukee Shaper Co. ....	133	Strong, Kennard & Nutt Co. ....	115
Can. Johnson Machine Co. ....	8	<b>I</b>		<b>T</b>		Swedish Steel & Impco. Co. ....	18
Chapman Double Ball Bearing Co. ....	97	<b>J</b>		<b>U</b>		<b>V</b>	
Cincinnati Electrical Tool Co. ....	137	<b>K</b>		<b>W</b>		<b>X</b>	
Cincinnati Milling Machine Co. ....	136	<b>L</b>		<b>Y</b>		<b>Z</b>	
Cisco Machine Tool Co. ....	132	<b>M</b>		<b>Other</b>		<b>End</b>	



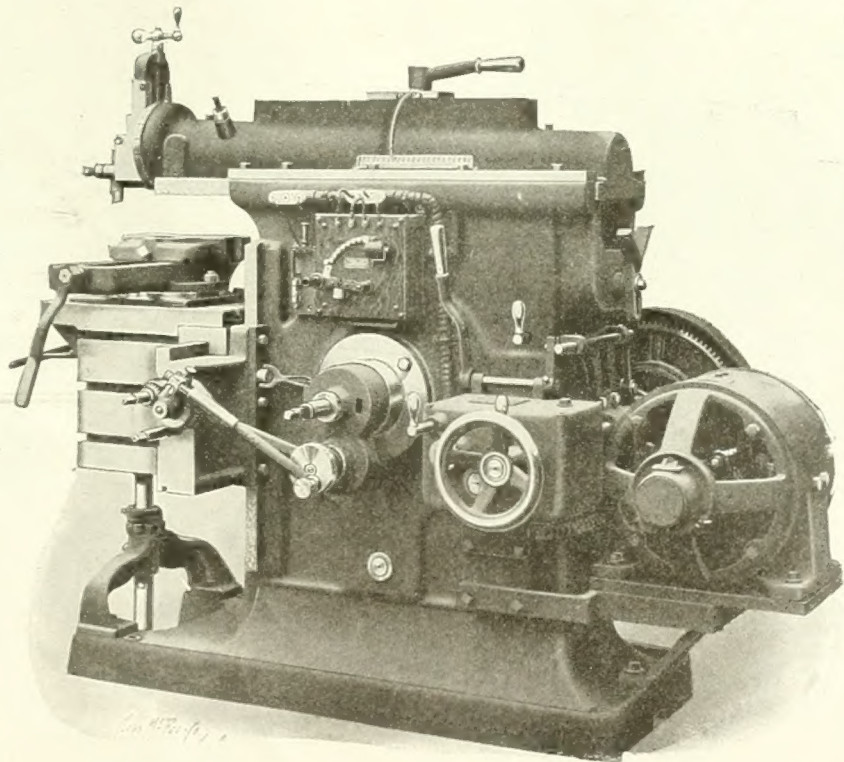
QUALITY *Foss* SERVICE

# SMITH & MILLS SHAPERS

## Permit Changing the Stroke Without Stopping the Machine

No stopping the flow of production with the Smith and Mills. You can change the length of the stroke, whether to shorten or lengthen it, without stopping the machine. You need only loosen locking screw and stop the shaft revolving and the adjustment is made very quickly.

The helical gear on bull wheel eliminates shock. A wrist-pin gear, fitted to the bull gear in an eccentric form, replaces the conventional bevel gear arrangement in the bull wheel. It's an ideal shaper for speed and accuracy.



Made in both Belt and Motor Driven Types.

*For full particulars write to*

SALES AGENTS:

**The Geo. F. Foss Machinery & Supply Co., Limited**

305 St. James Street

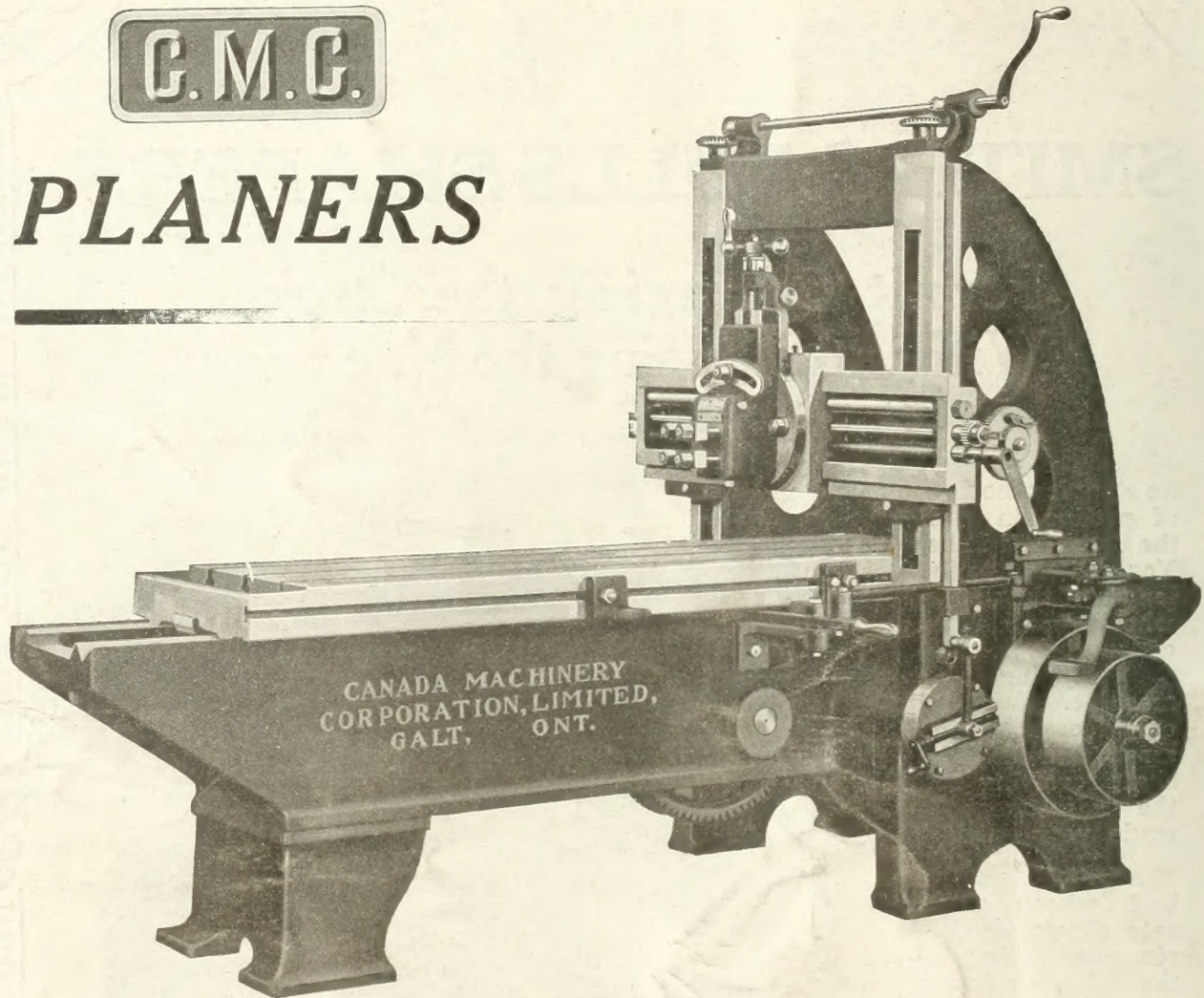
Montreal, Que.

QUALITY *Foss* SERVICE





## PLANERS



**SIZES.** The 24" x 24" x 6' planer shown above is the smallest planer manufactured by us. We make them in sizes up to 48" x 48" and in lengths to suit customers' requirements.

**DRIVES.** Machines are regularly built with single speed countershaft and standard drive, but can also be supplied with parallel drive or with two speed countershaft or four speed cone variator. Machines may also be arranged for motor drives as follows: With motor directly connected to first gear shaft; with motor mounted on housings and known as plain motor drive; with motor mounted on top of housings and connected to two or three change gear box, or through cone variator.

*"If it is a C.M.C. it is O.K."*

**CANADA MACHINERY CORPORATION, LIMITED, GALT, ONTARIO**

TORONTO OFFICE AND WAREHOUSES : BROCK AVENUE SUBWAY